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KEY TO PRONUNCIATION.

ä	far, father
ā	fate, hate
a or ă	at, fat
ã	air, care
ạ	ado, sofa
â	all, fall
ch	choose, church
ē	eel, we
e or ĕ	bed, end
ė	her, over: also Fr. *e*, as in *de*; *eu*, as in *neuf*; and *oeu*, as in *boeuf*, *coeur*; Ger. *ö* (or *oe*), as in *ökonomie*.
ẹ	befall, elope
ë	agent, trident
ff	off, trough
g	gas, get
gw	anguish, guava
h	hat, hot
h or ʜ	Ger. *ch*, as in *nicht*, *wacht*
hw	what
ī	file, ice
i or ĭ	him, it
î	between e and i, mostly in Oriental final syllables, as, Ferid-ud-din
j	gem, genius
kw	quaint, quite
ṅ	Fr. nasal *m* or *n*, as in *embonpoint*, *Jean*, *temps*
ñ	Span., as in ***cañon*** (căn′yŏn), *piñon* (pēn′yŏn)
ng	mingle, inging
nk	bank, in
ō	no, open
o or ŏ	not, on
ô	corn, nor
ȯ	atom, symbol
ọ	book, look
oi	oil, soil; als Ger. *eu*, as in ***beutel***
ö or oo	fool, rule
ou or ow	allow, bowsprit
s	satisfy, sauce
sh	show, sure
th	thick, thin
ŧh	father, thither
ū	mute, use
u or ŭ	but, us
u̇	pull, put
ü	between u and ẹ, as in Fr. ***sur***, Ger. *Müller*
v	of, very
y	(consonantal) yes, young
z	pleasant, rose
zh	azure, pleasure
′(prime), ″(secondary)	accents, to indicate syllabic stress

THE ENCYCLOPEDIA AMERICANA

C

COROT, kō-rō, **Jean-Baptiste-Camille**, French landscape painter: b. Paris, 28 July 1796; d. there, 22 Feb. 1875. Against the wishes of his family he studied art, first under Michallon, next under Victor Bertin, and then passed a year or two in Italy. In 1827 he first exhibited in the Salon, but it was not till nearly 20 years afterward that his genius in landscape painting was generally recognized. The last 25 years of his life were spent in affluent circumstances (his professional income being immense, and his father's death having brought him a large fortune) and in the happiness engendered by success. In 1867 he was made an officer of the Legion of Honor. Skilful as a figure-painter, it was in landscape that Corot excelled. He was a diligent student of nature, whose aspect he idealized on canvas with no profusion of color, but in sober tints of brown, pale-green and silver-grays. He was pre-eminently successful in painting scenes in the faint lights of dawn and twilight, behind a transparent veil of mist, the early rays glinting through dense foliage, mirrored in sparkling water. There is a sameness in Corot's work which forbids him the very highest rank, but within his own province he was inimitable. Among his works may be mentioned ‘Danse des nymphes’ (1851); Martyrdom of Saint Sebastian’ (1853); ‘Morning’ (1855); ‘Evening’ (1855); ‘Sunset’ (1857); ‘Orpheus’ (1861); ‘Rest’ (1861); ‘Solitude’ (1866); ‘Landscape with Figures’ (1870); ‘Pleasures of Evening’ (1875); and ‘Danse des amours.’ The Boston Art Museum contains his ‘Dante and Virgil’; the Metropolitan Museum in New York his ‘Ville d'Avray,’ and there are various other works by him in public and private American galleries. Consult Blanc, ‘Les artistes de mon temps’ (1879); Bigot, Ch., ‘Peintres français contemporains: Corot’ (Paris 1888); Claretie, Jules, ‘Peintres et sculpteurs contemporains: Corot’ (ib. 1884); Moore, Geo., ‘Ingres and Corot in Modern Painting’ (London 1893); Geoffroy, A., ‘Corot and Millet’ (New York 1903); Gensel, ‘Corot and Troyon’ (Bielefeld 1906); Meynell, ‘Corot and his Friends’ (New York 1910); Rousseau, ‘Camille Corot’ (ib. 1884); Robaut, Alfred, ‘L'oeuvre de Corot, catalogue raisonné et illustré précédé de l'histoire de Corot et de ses œuvres’ (Paris 1905); Roger-Milès, ‘Les artistes célèbres’ (ib. 1891); Thomson, D. C., ‘Life of Corot’ (London 1892); Stranahan, ‘History of French Painting’ (1899); Muther, ‘History of Modern Painting’ (London 1907); Van Dyke, ‘Modern French Masters’ (New York 1896).

COROZAL, Porto Rico, a municipal district of the department of Bayamon about 16 miles (direct) southwest of San Juan. It was much damaged by a hurricane in 1899. Pop. 11,508.

COROZO-NUT. See VEGETABLE IVORY.

CORPORAL, in the army, a non-commissioned officer with rank under that of a sergeant. He has charge of small bodies of men, places and relieves sentinels, etc. In the British army there are also soldiers distinguished by the designation of lance-corporal, who are privates acting as corporals but receiving only privates' pay. In the British household cavalry the sergeants are called corporals of horse and the sergeants-major, corporals major. This is a survival of the organization of the 16th and 17th century cavalry. In the United States army a corporal is the lowest non-commissioned officer. His especial duty is to place and relieve sentinels. The corporal wears two chevrons on his sleeve as a mark of his rank, the lance-corporal one only. A ship's corporal is an officer who has the charge of setting and relieving the watches and sentries and in general assists the master of arms.

CORPORAL, the linen cloth laid on the altar, on which the sacred vessels are set during the consecration of the elements of bread and wine in the Mass or Holy Communion. It is to be distinguished from the veil, which is used to cover the chalice and paten, and the palla or pall (q.v.). Both corporal and palla must be blessed and when not in use are carried in the burse, a square pocket of cardboard covered with silk; none except those in holy orders being allowed to touch them when they are in use.

CORPORAL, The Little. A term of affection applied to Napoleon Bonaparte by the soldiers of his Grande Armée, who always remembered that he began his career as a *sous-lieutenant* in Corsica.

CORPORAL PUNISHMENT, punishment applied to the body of the offender. In its connection with civil government it technically includes flogging, imprisonment and the death penalty, but in common parlance its meaning is more restricted and refers only to flogging or whipping of the body. Various extreme and cruel methods of punishment once in vogue have been discontinued in Christian nations, but are still practised in Oriental countries and among uncivilized races. The practice is supported by the argument that whipping which produces stinging but transient pain, without mangling the body and without such public disgrace as to destroy the sense of shame, is an efficient corrective for those cruel or brutal or intractable offenders, such as wife- and child-beaters and «white slavers,» who are insensible to the punishment of confinement or other ordinary penalties. Corporal punishment at the hands of public officers as a punishment for crime is usually inflicted by flogging in prison or at the public whipping post. It still survives in England and in many American States as a means of discipline of convicts confined in prisons. Corporal punishment was once considered indispensable in school discipline and was very severe in form in the schools of Europe before the advent of the Innovators (q.v.). Since that period its moral and even its immediate practical benefits have been increasingly questioned, and its practice has gradually lessened. American schools have gone farther in this respect than those of Europe. This form of punishment is forbidden by the school law of New Jersey, and to a greater or less degree is restricted in many municipalities of the other States. See Bastinado; Cang; Flogging; Torture.

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CORPORAL TRIM, a servant of Uncle Toby in Sterne's ‘Tristram Shandy.’ He is an old soldier and performs his duties in strictest military fashion.

CORPORATE EXISTENCE, Tests of. See Corporations, Legal.

CORPORATE FUNDS. See Corporations, Legal.

CORPORATE LIABILITIES. See Corporations, Legal.

CORPORATE RIGHTS. See Corporations, Legal.

CORPORATION NUMBERS. See Corporations, Legal.

CORPORATION SCHOOLS. See Schools — Corporation, and National Association of Corporation Schools, The.

CORPORATIONS, History of.— The origin of corporations is lost in antiquity. The word «corporation» comes from Latin *corporo,* from a Sanskrit root signifying «to form into a body.» «This masterpiece of juristic ingenuity is usually attributed to the Romans.» Yet they are said to have existed in Greece (594 B.C.), in Phœnicia (900 B.C.) and possibly in Babylonia (2200 B.C.).

A recent definition is: A corporation is «an association of persons to whom the sovereign has offered a franchise to become an artificial juridical person with a name of its own under which they can act and contract, sue and be sued, and who have accepted the offer and effected an organization in substantial conformity with its terms.» The prominent ideas are: *association, franchise* and *person,*— so related that the association «is converted by the franchise» into a new person, characterized by unity and continuity. «Groups» of persons or things are as old as human history. Wolf-pack, deer-herd, bee-swarm, must have been among the most vivid of man's pre-human experiences. Hunting-pack, totem-group, family-group, war-host were the earliest and most important of human experiences. «Man did not make society. Society made man.» The primitive fundamental personal conception is «our» or «we,» in which «my» and «I» are included but not distinguished. The «group» is the «entity,» which includes the individual, as a part of «it.» The family was a permanent body, with perpetual succession, including both the living and the dead, forming one individuality, distinct from its members. Radin says this is the datum to begin with, and its *corporate* character was «much more clearly apprehended than the conception of detached individuals.» Primitive society was organized along three lines: (1) *Kinship,* natural, involuntary, as tribe, clan, family; (2) *Totemistic,* artificial, as phratry, age-grade, etc.; (3) *Ceremonial,* quasi-voluntary, conventional, as secret societies, etc. All these were continuous units with distinctive names, usually with religious significance. In Solon's times (c. 594 B.C.) there were «*demos,*» «phratries,» «orgeones,» «gens» and «clans.» So, too, as early as the 8th century B.C., there were many «clanless» people, who were organized for Dionysos worship, on the model of the existing corporate bodies, such as clan, phratry, etc. The Greek terms were «thiasos»— band of initiated religious followers; «orgeones» — a fraternity of worshippers and celebrants; «eranos,»— a festal band of *collecta;* «koinon» — things had in common; and «synods» — a meeting together. The first three were used disjunctively and last two collectively, but interchangeably. In Latin, *collegium,* a group of colleagues, is the oldest term; *corpus,* a whole composed of parts, is next in frequency of use, and interchangeable with *collegium.* *Sodales,* a group of companions, was used for official brotherhoods. *Universitas,* a later term, signified «turned into one, all together, collectively.»

In all these words there is the idea of a unity in the possession of something, as, e.g., a religious rite or a slave. In the earliest history the «outward sign of all corporate organization was community of rites,» carrying with it the idea of continuity and permanency of association. *Societas,* on the other hand, was used for a temporary association. This idea of permanence persists throughout corporate history. With Ulpian (220 A.D.), «whether the individuals all remain, or are all changed, the corporation remains,» or Bracton (1260 A.D.), a corporation is as a flock of sheep, «always the same flock, though the sheep successively depart»; or Blackstone (1765), «all the individual members that have existed, or that shall ever exist, are but one person in the law, a person that never dies, as the river Thames is the same river though the parts are changing every instant.» In 1691 it was said that «the whole frame and essence» of a corporation consist in the franchises which constitute this body politic. Comyns (c. 1740) says «A corporation is a franchise created by the King." A franchise, by Blackstone (1765) and Finch (1613) is "a branch of the King's prerogative existing in the hands of the subject." Our Supreme Court (1887) says, "A franchise is a right, privilege or power of public concern, which is not to be exercised by private individuals . . . but should be reserved for public control . . . Corporate capacity is a franchise." The Continental doctrine is the same. No corporation can be created without authority from the sovereign or state. This probably comes from the Roman law. Greek and Roman corporations originally were mere voluntary associations. They early became centres of political conspiracy and required regulation. Solon (c. 600 B.C.) and the XII Tables (450 B.C.) permitted agreements not contrary to law. The Bacchanalian sacra were forbidden to be secretly celebrated by more than two men and three women, together, by a Senatus Consultum (186 B.C.). In 64 B.C. boisterous game celebrating colleges were dissolved. The Clodian law (58 B.C.) permitted them but the Licinian law (55 B.C.) again forbade them. Julius Cæsar abolished political collegia in Rome, and Augustus (7 A.D.) required all in Italy affecting the public to be sanctioned by emperor or Senate; Trajan extended this to the provinces (98–117 A.D.), and by the time of Gaius (c. 150 A.D.) and Marcian (c. 215 A.D.), unless a collegium is specifically authorized it is illicit, and its assemblies seditious.

The Carolingians prohibited guilds, unless authorized, on the Continent, while the Canonists, especially Innocent IV (1243–54 A.D.), evolved the doctrine that the corporation must be the creature of the state. As Maitland says: "Into its nostrils the state must breathe the breath of fictitious life, for otherwise it would be no animated body, but individualistic dust." These views found their way into English law by 1376, when "None but the King can make a corporation," which is still the rule. Although this "right to be a corporation" in recent times is now extended to all who comply with a few general provisions, and not by special grant to only a few persons, this has not changed the legal nature of the grant. The effect of such a grant is to convert the group of persons to whom the grant is made into "a legal or juristic person," for the purposes specified, and give them a different legal status from what they otherwise would have. "*Persona*" signified the mask an actor wore to indicate his part in a play, and in law a "person" is a subject of legal rights and obligations, and could be applied to either human beings or things. Amos says this idea had been applied to corporations long before Justinian (527–65 A.D.), but Pollock and Maitland say it is not so plainly written in the Roman law books that the Glossators (1100–1250) or Bracton's master, Azo (c. 1230), grasped it. This corporate personality is often said to be invisible, incorporeal, intangible, immortal, existing only in contemplation of law, a mystical body not found in the world of sense, an impalpable and intangible creation of human thought, a figure of speech, an abstraction, a fiction, a mere name.

On the other hand it is said it "is no fiction, no symbol, no piece of State's machinery, no collective name for individuals, but a living organism, with body and members, and a will of its own, as visible as an army, and as real as any aggregate of men, a *corpus corporatum*, a body made up of several bodies." These are different sides of the same thing. A natural person is a natural organism, a physical body and a legal conception. A corporation is a conventional organism, a physical body and a legal conception. From the earliest times Greek and Roman corporations are found in possession of property, stated to be that of the *corpus*, and not of the members jointly. When they died no action *de commune dividendo* arose. In Rome what the corporation owed the members did not owe, nor the reverse; the agent or slave of the corporation was not that of the members; its property was liable for its debts, but not for theirs, nor theirs for its; a member could be its debtor or creditor. What the greater part did was done by all; it took three persons to make a corporation but if reduced to one person, the corporation continued (*stet nomen universitas*); it was doubtful if a municipal body could be guilty of deceit (*municipes dolo facere non possunt*); a slave of the corporation could be required to testify against the members for he does not belong to them but to it (*nec plurium servus corporis*); and a municipality stood in the place of a person (*personæ vice fungitur*). Such is the summary of the Digest provisions (c. 528 A.D.). These were not wholly clear to Middle Age lawyers. The churchmen knew Saint Paul's "We are baptized to form one Body." Church was litrally "the Lord's house," but *ecclesia* was the assembly of its members. *Universitas* signified a group, or association. From the 2d century church property had been under the control of the bishop. Early form books of the 7th century suggested grants could be "to the church, built in honor of Saint Paul, to the monastery called X, where A is abbot." Gradually legists began to draw distinctions between universitas and other co-owners. The Canonists caught the idea and applied it to the church: "The *Ecclesia* is an *Universitas*, and the *Universitas* is a *persona*." This was fully worked out by Innocent IV (1243–54) and Bartolus (1314–57).

These general ideas were worked out anew in England. The course of development was through (1) church; (2) municipality; (3) guild; (4) regulated company; and (5) stock corporation. The Saxon who built a kitchen and "God-house" on his land thought he owned one as much as the other, although it was gradually realized that the pastor and his flock had some interests in the latter. Grants were usually made: "To Saint Andrew and thy Church," at, etc.; "Saint Paul holds land," etc.; "M holds of Saint Peter"; "Canons of L. hold"; "The Church, the Abbey, or the Abbot of Ely holds," etc., had the same meaning. As these saints retired the rector, abbots and bishops seemed to become owners, but yet not in their own right but as representatives of the Church, and as a succession of rectors, abbots, etc., so one could sue for the lands his predecessor had possessed. So, too, there were groups, such as "canons of H.," or "dean and chapter," "master and brethren," owning lands, who administered in meetings by resolutions, and who could sue and be sued. Such was being done before 1200 A.D.

Roman *municipia* were numerous over the Western world in the 1st century A.D., even in England. They were modeled after Rome, with magistrates, senate, assembly and «citizens,» and were centres of local self-government. The Saxon invaders frequently used them for camps, but there seems to be no continuity of organization. The «burh» — the fort on the hill, surrounded by hedge or wall, at a cross roads or river ford, where defense was needed, a natural place for trade, an asylum for the tribe and administrative centre for a district,— with all sorts of persons and all kinds of tenure, with a reeve to collect dues, rents, fines,— was the land community on its way to corporate existence. As early as the 10th century it had pleas of life, liberty and land, and numerous local customs, and there was such a place in nearly every shire in Domesday survey, upon which a separate or special return was made. From Norman times, the «farm» of the borough had been rendered by the sheriff of the county. But the king was willing to accept a «composition,» and the «burgesses,» wishing to have the amount fixed, raised money to buy a «charter» granting this privilege and confirming their customs. In 1130 Lincoln did this, and perhaps this had been done much earlier. In 1161–89 Henry II delivered «my borough of Cambridge» to «my burgesses of Cambridge,» to render same «farm» as before. John, in 1201, did the same to them and «their heirs, to hold in inheritance of us.» Edward II (1313) confirmed them to them and «their heirs and successors»; and in 1382 Richard II confirmed a plea saying that the borough of Cambridge was «one body and one community incorporate in itself.» After this numerous confirmations of the charters were made until finally in 1605 James I by charter declared the borough of Cambridge «shall be made and shall be one body corporate and politic in deed, fact and name by the name of the mayor, bailiffs and burgesses of the borough of Cambridge.» As early as 1311 a borough is called a «corps»; in 1346 the «Commonalty of London» can sue «as a single person,» and by 1391 they were «as perpetual as men of religion,» while by 1430 «the Commonalty and bailiffs of Ipswich are by this name a *person* and an entire corps.» That the minority should be bound by the will of the majority probably was taken from the church's doctrine of the *major pars* in church assemblies and the original practice of the Teutonic town-meeting. The franchises of the boroughs were various privileges of jurisdiction, tenure, official, self-government, taxation, by-laws, mercantile trading, etc., as well as providing in their own way for the «farm» of the borough.

«Gild» (geld) signifies worship, feast, contribution. Roman trade gilds,— *collegia opificum*,— attributed to Numa (c. 700 B.C.) were numerous,— 44 kinds were known to exist in Imperial Rome,— and included weavers, fullers, dyers, shoemakers, doctors, teachers, painters, flute players, smiths, goldsmiths and tanners. Smiths are the only ones mentioned in the Roman inscriptions in England. Although they existed in nearly every municipality of the empire, it is doubtful if they survived the barbarian invasion, and became continuous with the Middle Age gilds. They are mentioned about 800 A.D. in the Carolingian Capitularies, as *Conspirations*. They existed before the Norman conquest, in England, and soon afterward were widely spread trade organizations supervising the trade, conditions, processes, prices, material, tools, labor, hours, wages, apprentices, workmanship, weights and measures, in the trading towns. There were religious, merchant and craft,— the members being bound together by social, religious, commercial or other mutual interests. They were closely identified, perhaps officially, with the towns, and were organized in a similar way with governors and associates, wardens, aldermen, assistants, and held periodical meetings for feasts, admission of members, electing officers and passing or revising ordinances. It was once supposed that the grant to citizens of a town to have a «gild merchant» was equivalent to incorporating the town. While the «gild merchant» finally broke up into, or was displaced by, many craft gilds in the 15th and 16th centuries, the «organization» was largely adopted by the regulated companies.

Company (*cum, panis*), a bread breaking together, has much of the idea of the gild. In the 13th century gilds or companies for carrying on foreign trade sought recognition. The Brotherhood of Saint Thomas à Becket was founded in 1216 or 1248 by John of Brabant, as a gild of English Merchant Traders, and afterward as the Merchant Adventurers, with a monopoly of trading in wools and woolen goods, received additional grants in 1407, 1505 and 1564. In 1282 a gild of German traders obtained an exclusive right to trade in London. In 1391 Richard II granted to the *communitas* of English merchants trading in Prussia the ight to meet, elect a governor to rule over the traders, do justice and settle disputes between them. Henry IV, during the next 20 years, gave similar privileges to many other companies, and in 1490 Henry VII made the English merchants at Pisa a corporation. While it was not till about 1600 that English companies were incorporated in England, they had long before had substantially the powers of such under their gild organization. The members, instead of trading with a *joint stock*, traded separately on their own individual capital, subject to the *regulations* of the gild or *corporation;* hence the name *regulated* company. The great trading and colonizing corporations of the 16th and 17th centuries were of this kind.

The *joint stock* plan was the result of a combination between this regulated company and the continental idea of a joint stock. There were stringent laws against usury. Perhaps to evade these, the device of *commenda*,— similar to that of the Babylonian law, was resorted to all over Europe in the Middle Ages. Two parties, one with money and one without, together undertook to engage in trade and share profits; the one with money stayed at home but let his partner have the money to trade on abroad, the latter to have one-fourth of the profits after the expenses were paid. Later both would contribute the funds and one do the trading, and still later several might contribute the money, and the others do the trading; this differed from the *Societas*, in which each was supposed to be the agent of the others. In the *commenda*, only the active parties were liable. As early as 1346, various parties loaned money to Genoa, for conquest purposes, and she gave the shareholders an interest in the conquered lands. In 1407 the bank of Genoa took over the state loans, and issued a consolidated stock divided into shares, to those who had put up the money, and these were given the right to do a banking business (1408), and later (1453) to administer the colonies. In the 15th and 16th centuries these ideas began to be utilized in England for foreign trade. The Genoese Cabots probably were instrumental in introducing them. The Russia Company was incorporated with a joint stock, and shares, in 1553, as were many others soon afterward, including the Levant (1581), East India (1600), Hudson's Bay (1670), Royal Africa (1672). At first joint stocks were only for particular transactions, and it was not till 1657 that the East India Company had a permanent joint stock. In 1694, the group of persons who loaned money to the government was incorporated as the Bank of England, with a joint stock, based upon the «credit fund» of the state, upon which it was to pay interest, and which the bank could use as a basis of credit for doing an ordinary banking business. It seemed possible to extend this idea to trading purposes, so the South Sea Company was incorporated in 1711 to take over the floating debt of the state (£9,000,000), on which 6 per cent interest was paid, issue shares therefor, and use this as a «credit fund» to borrow money for trading with Peru. Later the English debt had increased to £31,000,000 by 1720. The Bank of England and the South Sea Company bid against one another for the privilege of acquiring this as a credit fund for enlarging their business,— the latter by a bid of £7,000,000 bonus, and accepting 5 per cent interest, and bribes, secured the privilege. The shares immediately rose enormously in value, and wild speculation began. In 1692, stock quotations began to be published; stock exchanges developed; stock jobbing began; all sorts of schemes,— for «perpetual motion,» to «import jackasses from Spain,» an «undertaking to be revealed,» were promoted; unincorporated stock companies, as well as incorporated ones with ill-defined purposes, arose on every hand,— a water company went to dealing in forfeited lands,— a banking partnership bought a charter of 1691 to make hollow sword blades. All this speculation led to the panic of 1720. To meet this the Bubble Act of 1720 was passed, forbidding the creation of joint stock companies, or transferable shares, unless they were incorporated, but making no adequate provision for the regulation of those incorporated. This was repealed in 1825, and the Crown was authorized to incorporate companies, making the members individually liable for the corporate debts. In 1834 such joint stock companies were to sue and be sued in the name of an officer. In 1844, a general act was passed enabling companies to be formed by a «Certificate of Incorporation» without special charter from king or Parliament, but with individual membership liable to creditors if the corporation's property was insufficient to meet its obligations. In 1855, 1856, laws enabled the formation of companies under Act of 1844, with limited liability, of members, and in 1862 these acts were superseded by the «Companies Act,» which with the amendments made since is the basis of existing English Corporation Law.

The colonial charter to Raleigh (1589) and to Virginia (1609–12) were for joint stock corporations, as was the Plymouth (1623), and Massachusetts Bay (1628), the seat of the latter being transferred to America. The grants to colonial proprietors, 1621 (New Scotland), 1629 (Carolina), 1632 (Maryland), 1634 (New Albion), 1681 (Pennsylvania), contained clauses broad enough to authorize the proprietors to create corporations, and in 1682, Penn incorporated the Free Society of Traders. Similar powers were conferred upon the royal governors, but when Governor Seymour incorporated Annapolis (1708), the legislature protested. Other governors disclaimed such power. The concessions to the proprietors in Carolina and New Jersey (1665) authorized the legislatures to create municipal corporations. There was much doubt about the power of the legislatures in other colonies to do so. Harvard College was authorized by an Act of 1642, but without an incorporating clause, which was not inserted till 1650, and then not published with the other laws. In 1652 a water company with quasi-corporate powers was authorized by the Massachusetts legislature. In 1649 the English Parliament incorporated the President and Society for the Propagation of the Gospel in New England; in 1701 the Society for the Propagation of the Gospel in Foreign Parts, and in 1709 the Society for the Propagation of Christian Knowledge. In 1693 William and Mary College in Virginia was chartered by the English sovereigns. The Bubble Act of 1720 was extended to the colonies in 1741, but without apparent effect. The constitutions of Pennsylvania (1776) and Vermont (1786, 1793), conferred power to create corporations on the legislatures, and when Governor Livingston of New Jersey undertook to incorporate a Baptist church in 1778, the legislature objected and he acquiesced. In 1781 the Congress of the Confederation incorporated the United States Bank, although the Articles of Confederation were silent as to such power. So it became the rule that the power to create corporations was vested in the legislature, and not in the executive side of our governments, State and National. According to Davis, there were 335 charters granted in the United States to the year 1800; by United States, 2; Maine, 23; New Hampshire, 32; Vermont, 20; New York, 28; New Jersey, 13; Pennsylvania, 23; Delaware, 3; Maryland, 21; Virginia, 22; North Carolina, 11; South Carolina, 10; Georgia, 1. Of these 34 were banking; 33 insurance; 75 inland navigation; 73 toll-bridge; 72 turnpike; 32 water supply; 4 dock; 8 manufacturing and 5 miscellaneous. Since that time, nearly every enterprise requiring large capital, and many others, are carried on by corporations. «They engage in commerce; build and sail ships; cover our navigable streams with steamers; construct houses; bring the products of earth and sea to market; light our streets and buildings; open and work mines; carry water into our cities; build railroads and cross mountains and deserts with them; erect churches, colleges, lyceums and theatres; set up manufactories, and keep the spindle and shuttle in motion; establish banks for savings; insure against accidents on land and sea; give policies on life; make money exchanges in all parts of the world; publish newspapers and books, and send news by lightning across the continent and under the ocean. Indeed there is nothing which is lawful to be done to feed and clothe our people, to beautify and adorn their dwellings, to relieve the sick, to help the needy and to enrich and ennoble humanity which is not to a great extent done through the instrumentality of corporations.»

In recent years there has been not only wonderful growth in the number and size of separate corporations, but also an extraordinary tendency to combine, into authorized consolidations, or unauthorized «trusts.» About 1900, it was estimated that the capital of great corporations formed in one or other of these ways was in the great industrial enterprises as follows: Railway consolidations, $9,000,000,000; industrial (manufacturing), $7,000,000,000; street railroads, $1,800,000,000; municipal service, $2,700,000,000; telegraph and telephone, $280,000,000; or a total of nearly $21,000,000,000, or about one-fifth of the total wealth of the United States. Very recently, too, there has been a great increase in corporation formation; corporations (having over $1,000,000 capital stock) were formed in the United States, with nearly $895,000,000 capital stock in 1914; with $426,000,000 in 1915; and $2,708,000,000 in 1916; and those (30,000 in number) with over $100,000 in 1916 had $3,529,000,000 capital. Similar, but not so great, increase in corporate activity has characterized other great commercial countries.

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CORPORATIONS, Legal. Characteristics. In general the legal status of a corportation is that of a *person,* with a name in which to do business, own or convey property, sue and be sued. It is normally managed by a board of trustees or directors, and officers, such as president, secretary, treasurer, etc. Its powers are those given at its creation. Its existence continues notwithstanding the death, withdrawal or insolvency of its members, or the transfer of shares, if it has a capital stock divided into shares. Its rights and obligations are its own, and not those of its members. Its creditors must look to it and to its property alone for payment, and not to its members, unless they have not paid for shares, or have wrongfully appropriated its property.

Classes.— Corporations are: *Aggregate,* created with a capacity to have more than one member at a time; or *Sole,* with capacity to have only one member at a time. Reduction to one member does not make an aggregate a sole corporation. Either may be: *Ecclesiastical* composed of ecclesiastical persons, for ecclesiastical purposes, and subject to ecclesiastical jurisdiction; or *Lay,* for temporal purposes, as «maior or communaltie, baylifes and burgesses,» and other business, social and literary purposes. In the United States, where there is no established church, church organizations, when incorporated, are *Religious Corporations,* and really *lay* corporations to manage the church business, without, and subject to no, ecclesiastical jurisdiction, except under the agreement of membership. Lay corporations are *Eleemosynary* (or charitable)— for the distribution of the alms of the donor or founder, as in the case of hospitals, colleges, etc.; and *Civil,*— for other purposes.

Civil corporations are: *Public,*— for governmental purposes, as the State, municipal corporations, etc.; *Quasi-public* (more properly, Public Service corporations),— for private gain but also to perform some public function as railroad, telegraph, etc., companies; and *Private,* — for advancing the interests of individuals in their private capacities. They are «not-for-profit,»— i.e., for the benefit of other than the members, as colleges, etc.; and for «profit,»— either pecuniary or otherwise. These are *non-stock,*— i.e., without capital stock and for some benefit other than pecuniary, as a literary society, or college fraternity; and *stock* (or moneyed),— for pecuniary profit by way of dividends on a *capital stock.* These classes are not mutually exclusive,— some corporations are within two or more of them.

In England, *lay* corporations are: *Trading* and *Non-trading.* They may be «chartered,» by the king; or «Statutory,» formed under acts of Parliament. These are usually called *companies.* The Non-trading are *Municipal,* for local government, or *Eleemosynary,* for charitable and benevolent purposes. Companies under the Companies Acts may be *limited by shares, limited by guarantee* and *unlimited,* according to the liability of the members. Other associations, resembling corporations, but without full corporate powers, or a «personal status,» separate from the members exist both in England and the United States. They are: *public,* as counties, townships, parishes, school districts, etc.; territorial units for governmental purposes, or institutions, such as asylums, penitentiaries, State universities, etc., controlled by boards, with quasi-corporate powers; or *private,* such as miners' federations, labor unions, etc., stock exchanges, boards of trade, partnerships, syndicates, cost-book mining companies, joint-stock companies, trusts and partnership associations limited.

Joint stock companies are similar to corporations, but unless excluded by contract or statute, there is an unlimited individual liability of the members for the acts of the managers. The capital stock is usually divided into transferable shares, represented by certificates, and an owner is not an agent of the company unless he is so appointed. Recently «Trusts» have been organized for business purposes, with the legal title and power of managing the property vested in trustees, subject to the trust deed, the beneficial interest being represented by transferable trust certificates. In the absence of notice and agreement to the contrary the trustee is liable to third parties as an owner, and to the beneficiary for breach of trust. Partnership Associations, Limited, are created under statutes of Pennsylvania, Ohio, Michigan, etc., with powers very like corporations, with a capital stock, transferable shares and limited liability of members; the property is held and conveyed, and suits, by or against, are in the association name; they are not corporations for suits in the Federal courts, as a citizen of the creating State, without alleging and proving that no member is a co-citizen of the other party. The New York joint stock companies and some of the English insurance companies are similar.

Continental Systems.— Corporations are «Juristic Persons» in the Continental law, following the Roman. However, associations similar to those noted above exist. They are provided for in the Civil and Commercial codes. The general term is «Associations» (*Societas, Genossenschaft*), which includes both. Juristic persons are *Public*, as the state itself (Fiscus); *Charitable* (Stiftung or Foundation), the property, rather than its owners or managers, being personified. There are Trading, or Non-trading partnerships, syndicates, joint adventures, for profit, and associations for a common enterprise not for profit. The members are co-owners, but not partners. The Trading or Mercantile (provided for in the Commercial codes) are: *Société en nom Collectif* (*offene Handelsgesellschaft*), equivalent to our general partnership, but considered a juristic person in the Italian and Japanese law, so that death or withdrawal of a member does not dissolve, as it does in English, French or German law. *Société en Commandite* (*Kommanditgesellschaft*), with members with limited, and others, usually the managers, with unlimited, liability, corresponding to the English and American special or limited partnerships. *Société Anonyme* (*Aktiengesellschaft*), or joint stock corporation with transferable shares, limited liability of members, and managed by directors elected by shareholders. *Société commandite par actions* (*Kommanditgesellschaft auf Aktien*), a combination partnership and corporation, with shares, shareholders with limited liability, and managing partners with unlimited liability.

Tests of Corporate Existence.— The line of demarcation between an incorporated and an unincorporated body is not sharply defined. There is no universally accepted mark of a «juristic person,» which excludes associations not such. The American courts have suggested these tests in the creating State: (1) There can be no valid corporation without legislative authority; (2) when the legislative intent is clear, that will control in the creating State; (3) when this is not clear, resort must be had to *powers conferred*, and which, in order to make a corporation, must merge and vest the rights and liabilities of the individuals into one distinct, artificial existence. The courts of other States, however, will come to their own conclusions, from the powers conferred, and will not be bound by the legislative or judicial declarations of the creating State.

Creation of Corporations.— Coke said the essentials are: Lawful authority; persons to be incorporated; name; place; apt words. *Lawful authority* may be either by common law; act of Parliament; king's charter; prescription; to which may be added, implication and consolidation. By the common law, kings, bishops, parsons, vicars, deans, governors and officers generally are held to be corporations sole, «by the universal assent of the people from remote ages,» and from necessity in order that they may carry out their official functions. For the same reason, the English «Parliament,» the «United States» and the separate States, are held to be corporations aggregate, but the «British Empire,» the «United Kingdom» and the «Church of England,» are not. The king is the state. Australia, however, is considered a corporation sole. By legislative act — in 1523 Parliament incorporated the «Colledge of Physitians,» and the king «in Parliament» has always claimed the power to erect corporations, as well as «without» Parliament. Like power inheres in the United States Congress, and in the State legislature, without express constitutional provision, and may be exercised by *special* or *general* act, if constitutions do not forbid. The colonial and State legislatures, in our early history, acted by *special* acts only. The Roman legislature acted either way. In 1597 a general law was passed for the incorporation of hospitals in England, and from 1844 to the present, various «Companies Acts» have been passed for the incorporation of companies by simple acts of registration. Public service corporations are usually provided for by special acts, embodying however various «general clauses,» and monopoly or eminent-domain power, for jurisdiction contrary to the common law can be conferred only by Parliament, if to be exercised within the United Kingdom. On the continent, corporations are formed under the general provisions of the civil and commercial codes, but the legislatures of the several States may act otherwise. In 1778 Protestant churches were allowed freely to incorporate in South Carolina. In 1784 churches were incorporated in New York under general laws; in Delaware in 1787; in Pennsylvania in 1791; canal companies in North Carolina in 1795. In 1808 Massachusetts regulated manufacturing companies by general law, and in 1811 New York, by general law, provided for their incorporation. In 1838 the Florida constitution directed the legislature to «pass a general law for the incorporation of all churches,» and forbade their creation by special act. In 1845 Louisiana made a similar provision for all corporations «except for political or municipal purposes.» New York (1846) made similar provisions, while

Ohio (1851) said «The general assembly shall pass no special act conferring corporate powers. Corporations may be formed under general laws; but all such laws may from time to time be altered or repealed.» One or the other of these provisions now exists in nearly all the State constitutions, put there to secure equality of privilege, uniformity of powers and to prevent fraud, corruption and loss of time, incident to special legislation. There is no such limitation in the Federal Constitution, so Congress may act either by special or general act. In the manufacturing act of 1808, Massachusetts reserved the right to amend or repeal it. After the decision of the Dartmouth College Case in 1819, holding that an accepted corporate charter constituted a contract, the obligation of which could not be impaired by subsequent State legislation, State constitutions and incorporation laws usually provide that corporation charters shall be subject to repeal or amendment. The inhibition in the United States Constitution, against impairing the obligation of contracts, is on the States only. The United States government is one of express powers, and such as are necessarily implied therefrom, and so Congress (except in the Territories and District of Columbia, where it has a general legislative power), can create corporations only to carry out some of these express or implied powers. King's charter — «Anciently, a gild, either religious or secular could not legally be set up without the King's license,» and in 1179 many «adulterine gilds» were amerced by Henry II. Bracton (c. 1260) said it was the exclusive prerogative of the king to grant franchises. However, as late as 1523, the Pope incorporated religious bodies in England. The bishops of Durham (a county Palatine) claiming *jura regalia* from the Conquest, incorporated the «Barkers and Tanners» at Gateshead, and granted charters to the city in 1565, 1602 and 1780. In 1376 it was held that only by the king could new corporations be created, though he could license another, as the chancellor of Oxford University, to create corporations to operate in Oxford. The Tudor sovereigns incorporated many «rotten boroughs,» for political reasons. Henry VII granted charters to John and Sebastian Cabot in 1496, 1498 and from then to Victoria many great trading and colonizing companies have been incorporated by the English sovereigns.

In the United States, in colonial times, the king chartered corporations, e.g., William and Mary College (1693). Governor Andros of New York (1675, fisheries), William Penn (1682, trading), and Lord Baltimore, exercised such authority, but since the American Revolution the power is vested exclusively in the legislature, and not in the chief executive. Prescription — A body which has claimed and exercised unquestioned, corporate powers so long as to raise a presumption that a charter existed, but lost by the lapse and accidents of time, is said to exist by prescription, which is sufficient until the contrary is proved. Implication — Coke says «of ancient times the inhabitants or burgesses of a ville or burg were incorporated when the king granted to them to have a merchant gild.» The king's charter to the «men of Dale and their successors,» or an act of Parliament granting an estate in fee to the «Conservators of the river Tone, and their successors» made them a corporation. Consolidation — this is now only by express legislative authority whereby two or more corporations unite to form a third, although in 1377 it was said one corporation could be so united to another as to succeed to its rights.

Persons to be incorporated.— Coke says these may be either natural or artificial, but where the statute says «Three or more persons may incorporate,» natural persons only are meant; however, in most of the States statutes authorize the consolidation, merger or amalgamation of two or more corporations into another, or the holding of shares in another. Sometimes incorporators are required to be citizens or inhabitants of the State, but not usually. A person incapable of contracting probably cannot be an incorporator, but incompetent persons may succeed to the ownership of shares. In the Roman and Continental law, a «bunch of property,»—a «foundation,» or an «inheritance» might be incorporated, but in the English and American law it seems persons only can be incorporated, although possibly an «image of an Indian God» may be, under the English law. Persons become members only by consent, in complying with the charter and by-laws, in non-stock corporations; but by the ownership of shares in stock corporations, either by original subscription, purchase from a former owner, or by operation of law. Subscriptions may be either: (1) to commissioners appointed to open books for that purpose; (2) in the incorporation paper, under general laws; (3) on a preliminary subscription paper; (4) agreement with a promoter; (5) contract with the corporation after it is formed; (6) underwriting; (7) application, allotment and notice. (1) and (2) are statutory and effective at once by force of the statute if it is followed. In (3) the corporation is not yet in existence, and if the paper reads: «We the undersigned hereby subscribe the shares set opposite our names,» there are four theories in the American courts: (a) A mere offer to the future corporation, revocable by withdrawal, death or insolvency, anv time before the corporation comes into existence and accepts; (b) A binding contract as soon as all the stock agreed upon is subscribed, the mutual subscriptions being considerations for one another, and since the group of subscribers is the same after, as before, incorporation, they then can enforce it in the corporation name. This accords with the intention and purpose of the parties. Only a few courts so hold however, the majority following rule (a); (c) Only an offer to the future corporation, but a contract among the subscribers, as soon as the subscription is complete. This recognizes the right of revocation as to the corporation, but not as to the subscribers. The result is not clear; (d) A binding agreement if, before incorporation, the subscribers have relied on the subscriptions to pay for property for the future corporation, and they cannot be placed in statu quo. (4) Subscriptions to promoters, before incorporation, are generallv held to be enforceable by the corporation, when it comes into existence against either the subscriber, or the trustee; In (5) there is no difficulty about parties or consideration, and the subscription may be either oral or in writing; (6) An *underwriter* agrees to take the stock not subscribed by the public, for a commission, or at a discount from the price to the public. The purpose is to guarantee the taking of the stock within a specified time; (7) Application, allotment and notice is the English method, where application is made to the promoters, who allot part or all the shares applied for, the contract being completed when the notice of allotment is dispatched. The effect of a completed subscription contract is to make the subscriber a member, whether or not he has paid, received a certificate or been registered as owner. He impliedly agrees to pay, upon call, the amount stated.

Name.— The early authorities said a name is of the very essence of the corporate institution, the knot of their combination without which corporate acts could not be performed. It is usually given by charter, but may be acquired by user. General laws require the name to be stated in the incorporation paper, and it must not be the same as another in the same jurisdiction. It may be protected as a trade mark, and its unfair use may be enjoined. A change of name does not change the identity of the corporation.

Place.—An old authority says: «There must be a place certain where to fix and bottome the corporation,» for «without a place no incorporation can be made.» General laws require the location of the «principal office,» or «place of business» to be stated in the incorporation paper. Places within and without the incorporating state may be stated.

Proper words.— «But not restrained to any certain and legal and prescript form of words.» Any, indicating an intention to incorporate, as «incorporate,» «found,» «erect,» «create,» «form,» or others, will do.

Incorporation.— Acceptance of all (not part of) the terms offered by the lawful authority by the persons to whom made is essential. Promoters usually have the papers prepared, and secure the acceptance by the persons to be incorporated; they stand in a fiduciary relation both toward such persons, and the corporation, if formed, and are liable for unfair dealing, to both. In a special act, or a charter from the king, the terms, conditions and forms of organization are set forth, and may be accepted formally by resolution, or informally by acting under them. A contract then results between the corporation and the state, constitutionally exempt from subsequent amendment or repeal, unless such right is reserved.

Charter.— The document containing the grants is called the charter. If a special act, after acceptance it is not only a contract, but also a law of that state, which every citizen thereof is bound to know. When the act is general, then the details of any proposed corporation must be set out in an «Incorporation Paper» (usually prepared by the promoters), often called Certificate of Incorporation, Articles of Association, Memorandum of Association, etc. The general law usually requires the purposes, name, place, capital stock, amount subscribed, number of shares, names of incorporators or subscribers, to be stated in this incorporation paper, which must be signed, and acknowledged in a specified way by a certain number of incorporators, and then filed, recorded or registered in designated public offices. Other provisions as to organization, powers, voting, meetings, transfers of shares, reports, amendments, dissolution and winding up are usually found in the general laws. These and the incorporation paper, executed as required, become the charter, and have the effect both of a *law* and a *contract*, as under a special act.

Compliance with Conditions.— Substantial compliance with the conditions precedent of the general law makes a de jure corporation, i.e., one invulnerable against the direct attack by the State. What are conditions precedent and what conditions subsequent are difficult to determine. Are the things to be done by the incorporators, or by the corporation? If the former, they are conditions precedent; if the latter, subsequent. In most States, a certain number of incorporators, written articles stating everything specified, executed in the precise way indicated, and filed as directed, are conditions precedent to de jure corporate existence.

De Facto Corporations.— In the United States, failure in some of these particulars does not make the effort abortive entirely. A good faith effort to organize under a valid law, colorable compliance therewith and corporate user,— although some condition has not been complied with,— results in a corporation de facto, valid as to all the world except the state in a direct attack for non-compliance with such condition. In a majority of the States it acquires a corporate status, and the members escape individual liability, as in a de jure corporation. Some deny this, in eminent domain proceedings by it, or to enforce preliminary subscriptions, or in suits against the members by persons not estopped by dealing with it as a corporation. De facto existence is not recognized in England or on the Continent.

Some courts go further and say that whenever a group of persons hold themselves out as a corporation, and thereby induce others to deal with them as such, it and they are estopped to deny the corporate existence, if it would be inequitable to do so. Some say estoppel arises only on matter of fact and not of law; others that there is estoppel only when there is de facto existence; and others deny the doctrine entirely.

Commencement of Corporate Existence. — Some statutes read «upon filing the incorporation paper the corporation shall be deemed to be in existence,» before stock is subscribed or organization effected. They require the incorporators *after* filing the incorporation paper to take subscriptions, and when the requisite amount is subscribed to call a meeting of the subscribers to organize. Only an inchoate existence seems possible until there are stockholders and organization. The weight of authority so holds, but there is authority to the contrary.

Where to Incorporate.—Arizona, Delaware, District of Columbia, Maine, New Jersey (formerly), Porto Rico, South Dakota and West Virginia have more liberal incorporation laws, and lower fees, than many other States. Business men dislike divulging business secrets, making reports and being hampered in their operations, and so prefer incorporating in the «liberal States.» To answer «where,» various matters are to be considered, requiring careful attention and comparison by a competent attorney.

Corporate Rights.—«By incorporation it acquires *jus personæ*, and is capable of all civil rights of having and doing.» So run the old authorities, and so was the Roman law. «No *freeman* ought to be disseized,» «No *person* shall be deprived of life, liberty or property,» and «No State shall deny to any *person* the equal protection of the law,» all include corporations; and generally the word person in statutes includes corporations, if the subject matter permits.

Of course a corporation has no body to be assaulted, beaten, imprisoned, hung or electrocuted, although old cases discussed the situation when it lost its head by the death or imprisonment of the dean of a chapter. It cannot «eat, drink or be merry,» marry, have children, heirs, brothers or sisters, although «to-morrow it may die.» It has no sex, race or color, but whether it is *it* or *they* has been discussed. It may have a good will, good or bad reputation and be slandered, libeled or maliciously prosecuted. It may be a «respectable and responsible person,» but not a «colored person,» or a «rogue or vagabond.» In England and Germany it may be an alien enemy if incorporated, domiciled or controlled by agents, in the hostile state. The inferior courts of the United States have held otherwise if only incorporated in the hostile state.

In the United States a corporation is a citizen of the incorporating State, regardless of the citizenship, domicile or residence of its members, for suits in the Federal courts, and an inhabitant of the district in which it has its principal place of business. It can do business and have agents in other States, and sue and be sued there.

On the other hand, it is not a citizen of the incorporating State, within the meaning of the clause «the citizens of each State shall be entitled to all the privileges and immunities of citizens in the several States.» Nor can it, nor its officers for it, refuse to produce its books and papers in evidence, because they would incriminate it. It has, however, whatever other rights are given it by its charter. And in general, a corporation has the same rights to sue either at law or in equity to protect or vindicate its rights as a natural person has.

Corporate Liabilities.— Corporations are subject to the general duties and obligations imposed upon other persons by the law, and are liable for breaches thereof. In the Roman law, Ulpian (*ad edictum*, 198–217 A.D.) said: «just as the prætor allowed an action on behalf of a municipality, he thought the edict should allow actions against one.»

Torts.— Corporations are now held liable for torts both in England and America. Such liability was of slow growth due to the «artificial personality» theory, current in the Middle Ages. In 1234 Gregory IX authorized the excommunication of ecclesiastical corporations, but in 1245 Innocent IV forbade such «as the *innocent* may . . . be caught by a sentence of this kind.» In 1348, in England, «The corporation is invisible, incorporeal, . . . Trespass does not lie against it, for *capias* nor *exigent*, lies not against a commonality,» and in 1356 «Nor can they commit treason, or be outlawed or excommunicated, for they have no souls.» This was frequently repeated (Coke 1600; Blackstone 1765) until down into the 19th century and corporations were thought not to be liable for torts or crimes of misfeasance. However, they were held in England for forcible disseizin (1357), and trespass (1371, 1430, 1454); negligence (Massachusetts 1810); conversion (England 1812); nuisance (Pennsylvania 1818); trespass to land (Delaware 1839); assault and battery (Florida 1842); deceit (Ohio 1846); false imprisonment (England 1851); malicious prosecution (Connecticut 1853); but denied in England until 1890 or 1904; libel (England and United States 1858); but only since 1880 for slander; exemplary damages (Illinois 1858); and tort in an *ultra vires* transaction (United States 1858).

Crimes.— Corporations were punished very early for delinquencies. The liberties of London were seized in 1245, for a false judgment by its magistrates, in 1264, for joining the barons against the king, in 1284, because the mayor, being bribed, connived at the bakers making their penny loaves six ounces too light, and many others, to the *quo warranto* in 1683, for extortion in tolls and the publication of a seditious libel. In 1811 a corporation was indicted for not repairing a bridge in England, and in 1812 in Massachusetts; in 1846, in England for disobeying a court's order, and obstructing a highway, followed by New Jersey in 1852; in 1876 for criminal libel in Missouri; in 1879 for Sabbath-breaking in West Virginia; in 1892 for keeping a disorderly house in New Jersey; in 1900 for criminal negligence, in not maintaining a bridge, causing death and equivalent to manslaughter by Canada Supreme Court. The United States courts refuse to go so far. Corporations, however, are generally held criminally liable for violations of pure food, anti-rebate, anti-trust and revenue laws, as well as for public nuisances. They are not yet held liable for higher felonies,— the requisite criminal intent supposed to be impossible and the punishments provided inapplicable.

Powers.— In England corporations chartered by the king have a *general capacity* to do anything not forbidden, while one created by an act of Parliament has only a *special capacity* to do what is expressed,—«only that and nothing more.» Yet both have the incidental power of succession, to contract, grant, sue in its name, purchase property, have a seal and make by-laws. The doctrine of special capacities has obtained in the United States from the beginning, and for all corporations. This has led to the doctrine of *ultra vires*, beginning in 1804 in the United States, and in 1846 in England, based on four principles: (1) a corporation has no powers except those granted by its charter; (2) whoever deals with it must know these; (3) stockholders should not be subjected to risks not contemplated; and (4) the state is interested that the powers shall not be exceeded. An entirely executed contract will not be disturbed at the suit of either party; so, too, a wholly executory contract will not be enforced, or damages allowed for its breach by either party. In England, in many States, and by the Federal courts, an *ultra vires* act is legally void, because of incapacity of the corporation; in many other States, void because illegal as against public policy; but in New York and others valid and enforceable whenever it would be inequitable not to do so. When such contract is executed by one party but not by the other, the decisions divide: those holding it is void will allow no suit on the contract, but permit recovery in quasi contract or tort for benefits conferred if unjust to refuse; while the New York courts would then permit recovery on the contract. If the public is injuriously affected by the *ultra vires* act, the State may dissolve the corporation in *quo warranto* proceedings. In the United States a business corporation may borrow money and give a note, secured by mortgage upon its property. In England the power is not so broad. There is no implied power to form a partnership, or become a guarantor or surety, for the accommodation of another. It may acquire its own shares to secure payment of a debt not otherwise collectible, but not for speculative purposes, to discriminate among its own shareholders, or defraud creditors. A corporation may acquire the shares of other corporations, but not for the purpose of controlling them. Investment, insurance and charitable corporations in some cases are held to have an implied power to invest in the shares of other companies. Many States by statute permit one corporation to hold stock in another. A corporation may now act as trustee, although the old cases said it had no conscience to be coerced by the chancellor. Statutes now generally allow the incorporation of trust companies with power to act as guardians, executors or administrators.

Landholding.— At common law, a corporation could acquire land as an individual, but this deprived the feudal overlord of his feudal relief, wardship and marriage fees, for corporations did not die, or have children. So in 1217, a gift to a religious house «is to be utterly void and that land is to accrue to the lord of that fee,» if he enters within a year, or the next higher lord within six months thereafter, and so on to the king. When the Franciscan friars came to England under a vow of absolute poverty, *dominion* was sinful. Their need of food and shelter was supplied by a benefactor conveying his property to another for their use (*ad oeps*), as Richard le Mulines did at Oxford in 1225. The clerics caught the idea, and *uses*, enforced by the chancellor, enabled the corporations practically to evade the mortmain acts of 1217 and 1279. Uses were devisable but legal estates were not. So in 1391, another mortmain act, extending to lay corporations as well as ecclesiastical, and including *uses* was passed. In 1535 the Statute of Uses carried the legal estate to the holder of the use and made it a legal estate. In 1541 the first statute of wills enabled a man to devise land to any one. This seemed to repeal the mortmain statutes, if the land was devised to a corporation, so in 1543 the wills act was amended allowing devises to any one, *except corporations*. Thereafter the mortmain laws which still exist in England prevent a corporation from taking or holding land either by deed or will, unless expressly authorized by its charter.

Mortmain statutes do not exist in the United States, and statutes of wills do not generally forbid devises to corporations. However, under the doctrine of special capacity, a corporation has power to acquire only such land as is reasonably necessary for its purposes. More is held *ultra vires*. What is the effect? Under the mortmain policy the overlord could escheat it to himself, but neither the grantor, his heirs, nor the grantee corporation could repudiate the executed grant. There is no overlord here,— but the State may bring *quo warranto* proceedings against the offending corporation for its *ultra vires* act,— yet the title remains in the corporation and the land continues assets of the dissolved corporation by the weight of authority. Some cases hold otherwise. A limitation in a statute of wills against devising has a different effect from a limitation in the corporate charter to take and hold land. A devise contrary to the statute is void, passes no title, the heirs inherit, and the corporation gets nothing. If there is no limit on the power to devise, but only in the corporation's power to take or hold, a devise to it will be good,— but the State may dissolve the corporation for taking or holding. Such is the weight of authority, but there are several decisions to the contrary. A corporation may take an estate in fee, for life, for years, or at will, in common, remainder or reversion, but not dower, curtesy or joint tenancy.

Corporate Funds.— All the title, legal and equitable, belongs to the corporation, and not to the members, in equity, or as tenants in common, and this is true if the membership is reduced to one person. He does not own and cannot replevin the property. A conveyance by persons of their own property to the corporation for all of its stock is a real conveyance subject to a stamp tax (if there is one), and afterward the property can be taxed to the corporation and the shares to their owners. A member has an equitable right to have the funds applied only to the corporate purposes. In business corporations, the funds are represented by a capital stock, divided into shares; the authority for this, or to increase or decrease the same, must come from the State. The amount is stated in the incorporation paper; it is raised by subscription, to be paid as called for; it is the basis of corporation credit. If the net property of the corporation exceeds this capital stock, there is a surplus; if less, a deficit. The market value of all the shares may be more or less than either the property or capital stock.

Shares are generally required to have a *par* value,— $10 or $100,— but in New York, Delaware and Maryland may, by statute, be created without *par* value. Shares may be created with a preference as to dividends at incorporation, but afterward only by unanimous consent or statutory authority. In the absence of statutory inhibition, shares may be issued at a discount, valid between the corporation and the subscriber, but not as against the creditor who has relied upon the par value of the outstanding stock; if he cannot get paid otherwise he may compel the balance of the par value to be paid. New York holds otherwise. Even if the statute says «all fictitious issue of stock is void,» the subscription at a discount is not void, the subscriber becomes a shareholder,— but he can be compelled to pay the «discount» for the protection of innocent creditors. Stock may be issued for such property as the corporation needs at a fair valuation, determined by the directors, and if in good faith and with reasonable judgment it will not be disturbed; excessive over-valuation is evidence of fraud, unless satisfactorily explained; a court of equity may require, for the protection of creditors, the difference between the reasonable value and that at which it was taken to be made good. Stock may be issued for patents, trade-marks, copyrights, formulas, good will and services, if reasonably valued, in most States, but not in all. New York allows the payment for construction work at the actual value of stock without reference to par value, and generally when a corporation is in failing circumstances, in a good faith effort to resuscitate it, shares may be issued as a bonus to «sweeten bonds» without liability to subsequent creditors.

In 26 States there are «blue sky laws» (q.v.), forbidding corporations or dealers to offer corporate securities,— stock or bonds,— for sale as a continuous transaction, without first reporting to and securing a license from the State securities commission. In many States similar provisions exist as to public service corporations, which are required to get authority from public service commissions.

Corporate Action.— Since a corporation is *one* person made up of *other* persons, an organization of some kind is necessary in order that «they» may manage «it,»— for it can act only through agents or organs provided in its constitution. These are duly assembled meetings of the members, or directors, officers, agents, servants,— the last two not being parts of the organization. To be valid, a meeting must be called by proper authority, notified as required, and attended by a quorum. These usually are regulated by by-laws. If not, notice must be personal,— and all notified. At common law, a quorum of members,— being a fluctuating body,— consists of those who come, though only one or two; but of directors,— being a fixed body,— a majority is required. These should be fixed by by-laws.

Voting may be by show of hands, polling, viva voce or ballot, and, at common law, was by persons and not by shares, although now, in stockholders' meeting, usually by shares; in directors' meeting not. A majority vote of the quorum controls. Voting by proxy is now usual among shareholders, but should be authorized by statute, charter or by-law provision. Directors cannot, unless expressly authorized, vote by proxy. Some States have authorized shareholders to cumulate their votes for directors.

Seal.— The old authorities said a corporation «acts and speaks only by its common seal.» This was the «visible sign of the invisible body,» by which its will was made known, and the only authentic evidence of it. Exceptions allowed were in trivial matters, as driving out trespassing cattle; doing what the corporation was appointed to do; buying and using goods. A seal according to Coke is «an impression on wax,» and this «magic of the wafer» yet exists in England, except as to corporations under Companies Acts (1908), which may contract in writing, by parole and without a seal wherever an individual may do so. Such has been the general rule in the United States since 1813 and 1827.

Members.—Their rights are Collective —(1) to elect directors, and sometimes officers; (2) amend the charter; (3) control the issue, increase and decrease of stock; (4) make and amend by-laws; (5) investigate management; (6) check *ultra vires* acts; (7) admit members; (8) remove members or officers for just cause; (9) dissolve the corporation,— all to be done in duly notified meeting; and Individual—(1) to have notice of meetings; (2) vote; (3) inspect books; (4) enjoin changes in the enterprise; (5) sue in equity for corporate wrongs on behalf of all, when directors wrongfully refuse; (6) have a certificate of stock, if any; (7) transfer same; (8) be registered as owner; participate in (9) profits, (10) issue of new stock and (11) in assets on dissolution.

Notice,— actual, necessary at common law; must conform to statute, charter or by-law, and if meeting is special, must state the purpose. Rules, same for shareholders' and directors' meetings.

Voting,— at common law by *persons,* not by shares, unless authorized by statute, charter or by-law. Directors vote only as individuals, not by shares or proxy. Shareholders may vote by proxy, if statute, charter or by-law allows, and perhaps such right may now be implied from the usual custom. Proxies are revocable, unless coupled with an interest. Voting trusts among shareholders are allowed in some States, in others not. If a corporation has 20 members each having one share, 11 votes could control; if these 11 form a trust to cast their 11 votes as a unit, to be determined by a majority of the 11, i.e., 6,— then the corporation is, or may be, controlled by 6 votes, instead of a majority; which is contrary to public policy by one view, but not by the weight of authority if not for some illegal purpose. Some States by statute allow cumulative voting; that is, if a member has one vote for each of five directors, he may vote all five for one and no more, or three for one, and two for another, and possibly thereby secure representation on the board.

Inspect books,— at common law only when a controversy existed between shareholder and the corporation, or among shareholders. The right is now usually broader, based upon the idea of co-ownership, but is usually regulated by statute, charter or by-laws. *Enjoin ultra vires acts,* on the theory that a member has an equitable interest in having the corporate funds applied to the corporate purposes only, and there is no other adequate remedy.

Certificate,— not necessary, but the usual and convenient evidence of membership, and when the shareholder is entitled to, he can compel its issue, or treat refusal as a conversion and sue for damages. It is not negotiable and a bonafide purchaser does not take it discharged of previous equities, unless the owner is estopped.

Transfer,— usually by endorsement, and delivery of the certificate for the purpose of transferring title. After endorsement in blank, it will pass by delivery, but a thief, or one getting his title from the thief, cannot pass good title so as to divest the real owner, if he was not negligent some way. In England the transfer is usually by a separate instrument.

Registration,— by weight of American authority, is not necessary to give transferee title, both legal and equitable. Some hold only equitable title passes by delivery of certificate without registration, and a few that registration is necessary to pass any title. Usually registration is for the convenience of the corporation in keeping track of its membership, giving notices and paying dividends — and in the absence of notice, corporation is not liable for following the register in these particulars. The rightful owner may demand and compel registration, or sue for damages for refusal. Corporation may demand reasonable proof of shareholder's right. In England and on the Continent registration is generally necessary to confer complete rights of membership.

Dividends,— are properly declared and paid only when there are profits or a surplus, but this may be from earnings or increase in value of property. Current obligations, interest and taxes should be paid first; sinking fund to meet outstanding funded securities when due, and depreciation, should be provided for, but are not legally required. When proper conditions exist, whether a dividend shall be declared and paid rests in the sound discretion of directors, and may be either *cash* or *stock;* if cash the money is paid out to shareholders; if stock the money is kept by the corporation, but the stock to an equal amount is issued to the shareholders, in which case there must be authority to increase the stock. A dividend is declared by resolution of directors, and when notified to shareholders, becomes irrevocable, and makes the shareholder a creditor of the corporation, for his part of the dividend, whether then due or not, and when the dividend fund is actually or constructively set aside, the shareholders then become not only creditors but the equitable owners of it. The owner of the stock at the time it is declared is the owner of the dividend, without reference to when the profits were earned, or time of payment, or name on the register, although the corporation will be protected if it pays the registered owner, without notice of the real owner. Of course the parties may stipulate as to who shall be entitled to the dividend, and when sold on the stock exchange its rules apply. Shares may have a preference in dividends if originally created as preferred and common. «Seven per cent. preferred» entitles the holder to receive 7 per cent before the common receives anything, but only out of profits; also, cumulative, i.e., to receive when profits are sufficient, what was unpaid up to 7 per cent for back years, although some courts hold this is not so unless expressly stated to be cumulative. By weight of authority, preferred shares are not entitled to participate in profits beyond their preference, but Pennsylvania holds that preference stock participates equally with the common after it has received the same as the preferred. Even if the preferred is guaranteed, it is entitled, not to interest, but to dividends out of profits only. Efforts to make preferred shareholders creditors, on equality with other creditors, in reference to the capital have failed, — and their stock is postponed to creditors' claims.

Participation,— proportionally, in issue of new stock, at its par value, whatever may be the market value, is a right incident to existing stock, of which the shareholder cannot be deprived without his consent. Participation in assets is considered below.

Directors.— Though elected by shareholders, or members, directors receive their authority from the State, and their judgment is not subject to control of members. They are clothed with the business powers only,— advisability of corporate action, selection of inferior officers and agents, application of funds, declaration and payment of dividends. These duties are fiduciary toward the corporation and shareholders and directors must act with reasonable skill and diligence,— that of any ordinarily prudent man in his own affairs according to some authorities — but since they get no pay, according to other authorities, only the ordinary care of a gratuitous bailee is required. To some extent they are general agents, mandatories and trustees, but, in good faith, by the weight of authority, they may deal with the corporation itself, though some authorities hold the corporations may object, if it acts promptly. Dealings between corporations having the same directors, or a majority of the same, are subject to similar rules. Slight evidence of unfairness or overreaching will enable the corporation to impeach the transaction.

Officers.— President, secretary, treasurer, — with the power incident to such officers in deliberative assemblies generally, and no others, without others are conferred expressly, or impliedly by «holding out,»— are customary. The secretary is usually made custodian of the corporate seal, and the president, general manager. For performing the official functions incident to their offices they are not entitled to pay, but for other service they are. There is no right of removal during term of office, by shareholders, unless statute, charter or by-law so provides. For gross misconduct, or fraud, a court of equity on proper application and showing may remove.

Creditors.— The corporation and its property only are liable to creditors; the members are not, unless they have not paid for their stock, or wrongfully received the corporate property, or by statute. The corporation has the same power, within its charter, to manage and control its property, without interference by creditors as would an individual, and as he may, so may the corporation, prefer creditors, by the weight of authority. Some States hold otherwise, and the present United States bankruptcy law now forbids preference made within four months of bankruptcy. Some permit the corporation to prefer its own officers as creditors, if there is no actual fraud. Perhaps the weight of authority is the other way however. Creditors of course may complain of the disposition of the corporate property for the purpose of defrauding them, and have all the ordinary rights at law and in equity, against the corporation, and its property, they would have against an individual, but in the case of a public service corporation its property cannot be taken on execution so as to prevent the performance of the public duties. Resort must then be had to the sequestration of earnings by receivership or otherwise.

It is often said that the corporate assets are a trust fund for the protection of creditors. Assets here include the corporate property, what is owing to it by others whether by members for unpaid stock or issued for over-valued property, or otherwise, or by others including claims for wrongs done to the corporation by the wrongful disposition or negligent dissipation of its funds. A receiver, in a court of equity, or a creditor by a creditor's bill, after an unsatisfied judgment against the corporation, can reach all the foregoing, so far as necessary to pay the creditors. This, however, is not a trust fund in the sense that the corporation has the legal, and the creditors have the equitable, title, before the court has taken possession of the property on behalf of creditors. Only such creditors as have relied upon the outstanding stock or property can complain. Creditors who become such *before* the unpaid stock was issued or *after* its property had been wrongfully dissipated cannot complain if they had or ought to have, knowledge of it. One dealing with a corporation has a right to assume all its stock will be paid in if necessary, that the officers will not negligently or wilfully dissipate the funds, and the shareholders will not divide them, without providing for creditors, and a creditor is not obliged to prove intentional fraud, in complaining of them. Several States impose a statutory liability on the members,— equal to the stock in some cases, or in proportion to debts, or for labor debts, for the benefit of creditors. It is, in general, secondary, enforceable only after corporate property is exhausted. *Debts* here usually means contract debts and not damages for torts. Several States also make officers liable for debts, if they fail to make certain reports at certain times.

State and Corporation.— The grant of a franchise, whether by special or general law, when accepted, makes a contract within «No State shall pass any law impairing the obligation of contracts,» and hence the legislature can neither amend nor repeal it without consent of grantees, or unless there is a reservation of power to do so. The Federal Congress is not expressly so limited, but it and the States «shall not deprive any person (which includes corporations) of life, liberty or property without due process of law.» The English Parliament and Continental legislatures are not so limited. Before a material amendment can become a part of a charter, it must be accepted, even if the power to amend is reserved, because persons against their will cannot be forced to exercise corporate functions they do not want, but if the power to amend is reserved they may be required to accept, or be dissolved. Material amendments require unanimous assent of the stockholders, unless there are express provisions to the contrary in the original agreement; immaterial may be accepted by a majority. Directors have no authority to accept. The courts are not in harmony as to what is, and what is not, material; adding banking powers to an insurance company would be material, but adding accident insurance to life insurance would not be so, by some authorities. If the power to repeal has been reserved in unqualified terms, it may be exercised at any time, and for any or no reason.

The State has the ordinary legislative powers — eminent domain, police and taxing — over corporations, that it has over individuals. Any corporate property, rights, privileges or franchises may be taken for public use upon making compensation. When the public safety, health or morals require, the State may impose burdens and the cost of complying upon a corporation without making compensation; it may also regulate rates for public service, if rates imposed allow a reasonable compensation for the service rendered. Taxes can be imposed as upon individuals, but not so as to deprive the corporation of the equal protection of the laws. Corporations, however, have a primary franchise,— the right to be a corporation, and many have secondary franchises,— as to operate a street railway in city streets,— which may be taxed. Methods of valuation are difficult, arbitrary and more or less unjust, when the «good-will» of partnerships and individuals is not taxes; for the value of the corporate franchises is usually fixed at the difference between the market value of the shares, and the assessed value of the other property. This would seem to include primary and secondary franchises, and good-will. Such methods of valuation have been generally sustained, though the good-will of partnerships and individuals is not taxed at all. In addition to this, and on top of it, the State may, and often does, tax the shares to their owners at their market value. This is legal, though unfair. The Federal government may tax corporations as it may individuals, but the States may not, without express permission, tax Federal corporations.

Corporations are subject to the ordinary jurisdiction of the courts, and in addition to an extraordinary jurisdiction under the prerogative writs of *quo warranto*, to dissolve a pretended corporation, or a valid one for misbehavior; *scire facias* to dissolve an existing corporation for violation of its charter,— judgment in both the foregoing is or may be *ouster; mandamus*, to compel the performance of a definite duty, when the ordinary legal remedy is inadequate; and *injunction* in equity, to prevent public injury where *quo warranto* is not adequate, but not for merely *ultra vires* acts in a suit by the State. A member, however, may enjoin such acts.

National Government and Corporations.— The Federal government has no express, but an implied, power to create corporations whereever necessary or desirable to carry out any of its express powers, as banks under currency power, railroads under interstate commerce power, manufacturing company to supply army or navy (armor plate, etc.). While the Federal Congress might make the exercise of such power exclusive in it, until it has done so, the States have and exercise a concurrent power to create corporations for carrying on any of these purposes. Except in the Territories and in the District of Columbia, Congress probably cannot create corporations for other purposes than those stated or implied in its express powers, to operate in the States, against their consent, although because the National banks and the Pacific railways incorporated by Congress do a local business, it has been argued that Congress can give such capacity, if not the legal right, to do such business. Under the «commerce power,» Congress has not only incorporated railroad companies to build and operate interstate railroads, but also a canal corporation with authority to construct a canal in a foreign country. Congress has provided for regulation of corporations, whether created by it or by the States, so far as they engage in interstate and foreign commerce by the Interstate Commerce Commission, the Federal Trade Commission, the Federal Anti-trust Act, Employer's Liability, Child Labor Laws, etc., and the banks by the National Bank and the Federal Reserve Banks, acts.

Foreign Corporations.—«A corporation exists and must dwell only in the state of its creation, and cannot migrate to another state,» according to the Supreme Court of the United States. Yet it may through its agents do business in another State, have a domicile, hold meetings, be taxed, sue and be sued and served with process there, so as to justify a personal judgment there, with the same effect as against a natural person actually there. Yet the corporation is considered as being a citizen of the State creating it, even though it has been required to file its incorporation papers in the other state and authorized to do business there, and is declared to be a «domestic» corporation by that State,— it is nevertheless a different corporation from the one in the State where it was incorporated, although it may have the same members, officers, offices, capital, stock and powers. So too, if corporations of two or more States are authorized and do consolidate into one, with one membership, stock, officers, powers and place of business, there are as many different corporations as there are States, each tracing its life to the legislation of the State originally creating it, and subject there to its laws. The States of the Union are foreign to one another, and the corporation of one State, although it has corporate capacity, has no legal right to do business in any other State without its consent for it is not a citizen under the «privileges and immunities» clause of the Constitution. It may be excluded or discriminated against, when it seeks entry into another State, although after it is within the jurisdiction of such State, it cannot be denied the equal protection of the laws; this, however, gives no right to enter, or stay after entry, if the license is revoked. The States, however, cannot so exclude corporations of other States engaged in interstate or foreign commerce, from carrying on such or unreasonably hamper them therein. Notwithstanding these undoubted powers of the States, there exists a «comity» between the States, whereby, in the absence of express provision or a public policy to the contrary, the corporations of any State or foreign country are permitted to exercise their corporate powers in another, and its courts are open for the protection and vindication of their rights therein. Many of the States require the corporation to file its articles of incorporation and appoint a resident agent upon whom service of summons may be made in the State where it seeks to do business. Sometimes penalties are provided. The courts are in hopeless conflict as to the effect of non-compliance with such statutes. Some say a contract so made is *void*, and can be enforced by neither party; others that it is enforceable by either,— only the State can enforce the penalty if there is one; still others that the corporation cannot enforce any contract until compliance.

Continental theories vary; one is that the corporation can have a *personal status* only in the creating state, not elsewhere; another is that *personal* status of an individual is always a matter of law, and there is no more difficulty in recognizing the personal status of a *corporation* than of an individual, and since the status of the latter is recognized as of right, the former ought to be also; another says that corporations have both *civil* and *functional* capacities; so far as the *civil* status of an individual is recognized in a foreign state, likewise that of a corporation should also be, but its *functional* capacity should be recognized only by express permission.

Dissolution and Winding up.— Corporations may be dissolved: (1) By lapse of charter period; (2) repeal of charter; (3) judgment of ouster in *quo warranto* or *scire facias;* (4) surrender accepted by the state; (5) death of all the members in a non-stock corporation. Insolvency or reduction to one member does not itself work a dissolution with us, as it did not at Rome. In England under Companies Acts, if membership is reduced below two (private companies), or seven in other companies, it is a cause for winding up. Similar provisions exist in some of the Continental codes.

The common law had no adequate method of winding up the affairs of a dissolved corporation, and looked upon the situation as that of a dead man without administrator or heirs; personal property went to the king as *bona vacantia;* real property reverted to the grantor or his heirs; all claims in favor of or against the corporation were ended. In the absence of provisions to the contrary, such seems yet to be the English law, and formerly was in the United States, although here it was often said to have grown up in reference to the English ecclesiastical corporations, it was unsuited to our conditions and was unjust. In 1855 the United States Supreme Court so vigorously assailed this view, that since then, even in the absence of statute, courts of equity have at suit of creditors or shareholders entertained suits to wind up the affairs of a dissolved business corporation, usually by appointing a receiver, to collect all the claims owed to the corporation, convert all its property, both real and personal, into money, pay the corporate debts and distribute the balance to the shareholders. The courts, however, are not yet in accord as to what shall be done with the unexecuted contracts of the corporation; some say no damage can be had for their breach by dissolution; others that there can be, if the dissolution was voluntary on the part of the corporation.

Until recently, in the United States, the common law rules have been applied to the dissolution of non-stock and charitable corporations. Recent cases have taken a different view, but the United States Supreme Court applied the common law doctrine to the dissolution of the Mormon Church in 1890. In many States the matter is fully covered by statute, and under the English Companies Acts, there are elaborate provisions for the appointment of an official liquidator, with powers and duties similar to those of a receiver under the equitable procedure in this country. On the Continent, the directors are usually made liquidators under the Commercial codes, with similar powers. See CHARTER; DARTMOUTH COLLEGE CASE; CONTRACT; FRANCHISE.

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CORPORATIONS, Political Contributions by. See CORRUPT PRACTICES ACT.

CORPS, kōr (Fr. «body»), a word often used in military and political language. The term is applied to various kinds of divisions of troops; the *corps d'armée* is a military unit consisting in from two to four divisions (the German *Heeresabtheilung;* our field army. See ARMY ORGANIZATION); *corps de garde;* a guard-house; also the body which occupies it.

In political use, *corps législatif* was used from 1857 to 1870 of the lower house of the French legislature; its members were elected for six years. *Corps diplomatique* refers to a nation's entire body of ambassadors, ministers and other diplomatic officers.

CORPSE (Lat. *corpus,* «body,» through Fr. *corps*), a dead body, usually animal, and in most common usage applied only to the human body. To the human corpse there can be no property rights, save in the rare case of disposition by regular will of one's body. Questions as to disposition of a corpse must be heard by an ecclesiastical court in England, by the usual civil courts in the United States and elsewhere if Church and state be independent. Prior right to a dead body naturally goes to the nearest of kin, marriage ties ranking above those of blood. Burial expenses come under the general head of property rights in that they take precedence over any claims against deceased or his estate. Privileges of the corpse extend still further; pagan superstition, which identified to a certain degree body and soul and long established Christian belief in the resurrection of the body, combine with the law's view, to make mutilation of the buried body, or body-snatching, (as digging up the corpse for anatomical or other purposes is called), detested and criminal. Both practices are still widely exercised and public opinion seems less severe than formerly. See BURIAL; CREMATION; MAUSOLEUM; MUMMY.

CORPULENCE. See OBESITY.

CORPUS CHRISTI, Tex., city and county-seat of Nueces County; on Corpus Christi Bay, at the mouth of the Nueces River, and on the Mexican National and the San Antonio and Aransas Pass and the Saint Louis, Brownsville and Mexico railroads, 140 miles south of San Antonio. Corpus Christi has regular steamboat connections with New Orleans. It is the stock-raising and farming centre of the county and has an extensive fish and oyster-packing business, several daily and weekly newspapers, a Catholic convent, several churches, a national bank and an assessed property valuation of $2,000,000. It is a popular health resort. In 1909 it adopted the commission form of government. The city owns its waterworks. Gen. Zachary Taylor encamped here during the Mexican War, and his entrenchments are still preserved. Pop. 8,222.

CORPUS CHRISTI, Festival of, a holiday instituted by the Roman Catholic Church in honor of the mystery of the Eucharist, observed on the first Thursday after Trinity Sunday. Its observance began in the diocese of Liége while the archdeacon of that diocese was James Pantaleon, who afterward became Pope Urban IV. In 1264 Urban composed a bull ordering throughout the Church the celebration of the festival on the Thursday following the first Sunday after Pentecost: the bull seems not to have been promulgated save, perhaps in the city of Rome, for though the festival was duly observed by the Pope and his court, no proof exists of its celebration on that year or after for a long time in other parts. The proximate occasion of Urban's act was the reported occurrence of a miracle at Bolsena in the Papal dominion, when a priest in saying the mass accidentally spilled out of the chalice some drops of the sacramental species of wine and tried to cover it up with a linen cloth: forthwith the cloth was covered with red spots in the form of the sacred host. The bull of Urban was revived at the Council of Vienne, 1311, by Clement V. The procession of the Host in connection with the festival was instituted by Pope John XXII and succeeding pontiffs down to the Council of Trent were zealous for the observance of the holiday. The Council of Trent declared the institution to be a triumph over heresy regarding the doctrine of the Eucharist. At the Reformation it was one of the first holidays abolished by Luther. The procession is eliminated even by Catholic communities in places where there is strong division of religious sentiment.

CORPUS CHRISTI COLLEGE, Cambridge, England, sometimes called Benet College, was founded in 1352 by the united guilds of Corpus Christi and the Blessed Virgin, two fraternities which used to meet for prayers at Saint Benedict Church and Saint Mary's respectively. The endowments of the college were considerably increased by Archbishop Parker, who also bequeathed to it his valuable collection of manuscripts. It consists (1914–15) of a master and 14 fellows, besides 19 scholars. The college has the patronage of 10 livings. The college has a wonderful collection of plate and the Lewis collection of printed books. Christopher Marlowe and John Fletcher were members of Corpus Christi.

CORPUS CHRISTI COLLEGE, Oxford, England, a comparatively small college founded in 1516 by Richard Fox, bishop of Winchester and lord privy seal, under a license from Henry VIII. It consists (1915–16) of a president, 14 fellows, 32 scholars, 4 exhibitioners, 2 chaplains and 82 undergraduates. Three of the fellowships are annexed to two professorships, the professors occupying the position of honorary fellows, being elected by boards appointed by university statute. The college has the patronage of 16 livings. It counts some famous men among its members, notably Udall, author of 'Ralph Royster Doyster'; Richard Hooker; Keble, the hymnologist; Thomas Arnold, master of Rugby, and Chief Justice Coleridge.

CORPUS DELICTI (literally «the body of the crime or offense»), in Scottish law, those external marks, facts or circumstances which accompany a crime, and without the proof of which the crime is not supposed to be established. Thus the *corpus delicti* of homicide is establishing the fact that the person has died of violence, not merely that he has died. According to German law no crime can be established unless the *corpus delicti* is clearly present, and self-accusation or confession without this does not empower a court to convict. Consult authorities cited under CRIMINAL LAW.

CORPUS DOCTRINÆ (Lat. «body of doctrine»), in German ecclesiastical history, the name given to each of several collections of theological writings promulgated by various German Protestant churches during the 16th century. Among the most important of these collections were the 'Corpus Misnicum' or 'Philippicum' (1559), enforced by the elector of Saxony, containing the Apostles', Nicene and Athanasian creeds, the Augsburg Confession and Melanchthon's 'Loci Communes'; the Pomeranian of 1561; that of Nuremberg of 1573; and the Hamburg (1560), Brunswick (1563), Pomeranian (1564), Prussian (1567), Brunswick-Wolfenbüttel (1569), Saxon (1570, called Corpus Thuringicum); and others of a Lutheran character. These were all superseded in 1580 by the 'Formula Concordiæ.'

CORPUS JURIS CANONICI, the body of laws for government of the Church enacted by popes, councils and synods or drawn from the writings of the fathers, and the whole approved and promulgated by the holy see. There were numerous collections of canons made and published both in the East and the West prior to the time of Gratian, the Camaldolese monk, professor of theology in the University of Bologna, who in 1139 compiled the *Decretum,* called also *Decretum Gratiani,* which constitutes the first part of the body of the canon law. It is the first methodized general collection of Church laws from the time of Constantine to the year of its publication, and is in three books, treating, the first, of ecclesiastical persons and offices; the second, of cases arising under the several canons, decretals and other authoritative rules; and the third, of the sacraments and rites of the Church. The second part of the Corpus Juris Canonici is the Decretals of Gregory IX, promulgated in 1234. This book contains all decretal epistles of popes from 1139 to the date of its publication. It is followed by the Liber Sextus, 1298, promulgated by Bonifacius VIII; by the Clementinæ or constitutions of Clement V, 1317; finally the Extravagantes, revised in 1563, contain all decretals promulgated to that date. With the Extravagantes ends the systematic compilation of matter of canon law. In the reign of Henry VIII the English Parliament ordered a revision of the Corpus Juris Canonici to make it conform to the new order of things brought about by the law of the king's supremacy in matters of religion: meanwhile the old system was to hold so far as might consist with the new order. But no revision has been made, and hence, with a few reserves, the Corpus Juris Canonici is law for the Church of England. For the *Corpus Juris Civilis* see CIVIL LAW; see also CANON LAW.

CORPUSCLE, in anatomy, a small, usually microscopic, body regarded by itself and defined by some qualifying term; as, blood corpuscles (see Blood); the Malpighian corpuscles of the kidney and of the spleen; the tactile corpuscles, otherwise known as Meissner's, Wagner's and palpation corpuscles, found in certain papillæ of the skin of the hand and foot, the gustators or taste corpuscles of the papillæ of the tongue, etc. See Pacinian Corpuscles.

CORPUSCULAR PHILOSOPHY, a name sometimes applied to the atomic philosophy taught by Leucippus and Democritus (qq.v.) According to their doctrine matter is eternal, and everything in the whole universe, including the soul itself, is produced by a special arrangement and aggregation of minute indivisible bodies or particles called "atoms." These atoms are of various sizes and shapes, and, in some forms of the theory, of different qualities; and it is on these primary differences, combined with the endless varieties of position and figure, that distinctions between things are based. Change is but a rearrangement of atoms caused by their unceasing primary motions. This philosophy was elaborated and developed by Epicurus (q.v.) and other thinkers and received its grandest expression in the great poem of Lucretius (q.v.) 'De Rerum Natura' ('On the Nature of Things'). It may be regarded as an ancient form of the modern atomic theory (q.v.), which, however, differs from it in being, not a philosophy of the universe, but merely a hypothesis concerning the physical constitution of matter, adopted in order to give convenient expression to scientific facts and to aid in scientific advance.

CORPUSCULAR (or **EMISSION**) **THEORY OF LIGHT,** the older theory, which explained the phenomena of light by supposing that a luminous body emits excessively minute elastic particles of matter, "corpuscles," as they were called, which, striking the eye, produce the sensation of light. See Electron Theory; Light.

CORRAL, kôr-räl', **Ramon**, Mexican statesman: b. Alamos, in the state of Sonora, 10 Jan. 1854. When 21 years of age he had established and successfully conducted two newspapers, *El Fantasma* and *La Voz de Alamos*, but in 1875 abandoned the newspaper field, later writing a history of the state of Sonora. He was subsequently elected to the Sonora legislature, and later secretary of the state, in the latter capacity rendering invaluable service in the preparation of various important laws. Later he had much to do with the revision of the penal code of the federal district. He represented the state of Sonora in the federal Congress for a considerable period; in 1887 was elected lieutenant-governor of Sonora, exercising practically all the powers of the governor, by designation of that official; from 1891–95 was secretary of the same state; and later was unanimously elected governor. On 15 Sept. 1900 Mr. Corral became governor of the federal district; became secretary of government 16 Jan. 1903; and in 1904 was elected to the vice-presidency of the republic.

CORRASION, mechanical wear by wind, running water or moving ice, producing actual abrasion of a rock mass, as contrasted with corrosion, a chemical process of weathering.

CORREA, kŏr-rā'ā, **DE SERRA, José Francisco,** Portuguese scholar: b. Serpa, Alemtejo, 6 June 1750; d. Caldas, Rainha, 11 Sept. 1823. He was educated in Rome and Naples, was admitted to holy orders and soon after his return to Portugal in 1777 was made perpetual secretary of the academy recently instituted at Lisbon. He collected cabinets of natural history, especially of botany, established a laboratory for scientific research and prepared for the press numerous unpublished documents relating to the history of Portugal. Accused before the Inquisition, he escaped to Paris in 1786, but was permitted to return to Portugal after the death of Pedro III, where he took up residence with Lafões. At Paris he had been intimately associated with the naturalist Broussonet, and became the host of the latter when he fled in disguise from the reign of terror to Lisbon. Endangered by the detection of Broussonet, he took refuge first in Gibraltar and then in London. He lived in Paris in learned society and pursuits from the Peace of Amiens till 1813, when he came to the United States, where he continued his scientific studies, and in 1816 became Minister plenipotentiary of Portugal. He was recalled to Portugal on the promulgation of the Constitution of 1820, and made Minister of Finance. His most important writings are treatises on the physiology of plants and a collection of unedited memorials of Portuguese history (in 4 vols., 1790–1816).

CORREGGIO, kŏr-rĕd'jō, **Antonio Allegri,** Italian painter, frequently called Antonio da Correggio, from the place of his birth: b. Correggio 1494; d. there, 5 March 1534. He was intended for a learned profession, but nature had designed him for an artist. It has not been ascertained how much he was indebted to his first instructor, who was probably his uncle, Lorenzo Allegri. Three qualities will always be admired in him — grace, harmony and a skilful management of the pencil. There is a peculiar grace in the movements of his figures and a loveliness in their expression which takes possession of the soul. These attitudes and movements could not be executed by any artist without his masterly skill in foreshortening, which not only gives greater variety to a piece, but is also favorable to gracefulness. Avoiding all roughness and hardness, Correggio delights by mild and almost effeminate beauties. He strove to obtain this object also by harmony of coloring, of which he may be called the creator. He is unrivaled in the *chiaroscuro;* in the grace and rounding of his figures and in the faculty of giving them the appearance of advancing and retiring, which is the distinguishing excellence of the Lombard school, of which he may be considered the head. In his drapery, he calculated with extreme accuracy all the effects of the *chiaroscuro*. He possessed the power of passing, by the most graceful transition, from the bright colors to the half tints. It was his object to make the principal figure prominent, that the eye, after gazing till it was satisfied on the bright colors, might repose with pleasure on the softer masses. He made a skilful use of this art in his 'Night' (*la Notte*), which is to be seen in the gallery in Dresden, where there are seven pictures in which his progress in the art may be recognized. Among his best pictures, besides the 'Night,' are the 'St. Jerome,' which has kindled the admiration of several distinguished painters to such a degree as to render them unjust toward Raphael; the 'Penitent Magdalene'; the altar-pieces of Saint Francis, Saint George and Saint Sebastian; 'Christ in the Garden of Olives'; 'Cupid'; the fresco painting in Parma; and, above all, the paintings on the ceiling of the cathedral in the same city. In 1520 he was married to Girolama Merlini, who appears to have inspired several of his most charming Madonnas. Of his four children, a son and daughter survived; the former, Pomponio, was a painter, but vastly inferior to his father. The story of his extreme poverty, and of his death in consequence of it, has been long since disproved, yet Oehlenschläger has made it the subject of one of his best tragedies in German and Danish. Consult Meyer, 'Correggio,' Heaton's translation (London 1876); Landon, 'Vie et œuvres de Correggio' (Paris 1803–20); Morelli, 'Critical Studies of Italian Painters' (Vol. II, 1893); Ricci, 'Antonio Allegri da Correggio' (London 1896); Thode, "Correggio," in 'Künstler-Monographien' (Bielefeld 1898). Consult also the monographs by Sturge Moore (London 1896) and Gronau (Stuttgart and Leipzig 1907); and Berenson, 'Studies in Italian Art' (London 1901).

CORREGGIO, Italy, city in the province of Regio nell' Emilia, about 25 miles northwest of Modena. In the Piazza is a statue of the painter Antonio Allegri, known as Correggio, who was born here in 1494. The modern town has none of the importance of the mediæval city, which was the capital of the principality belonging to the duchy of Modena, and the princely castle still remains. Its importance in history is due to its having been the birthplace of the painter Correggio. Pop., 16,996.

CORREGIDOR, kôr-rĕ'ji-dôr, Philippines, an island lying in the entrance to Manila Bay and forming a part of the inner line of defense of the city of Manila; length, east and west, four miles; average width, one mile; area, two square miles. It rises on the west coast to a height of 649 feet above the sea; on the highest elevation is the semaphore station of the port of Manila, from which the approach of vessels is signaled. There are also four lighthouses on the island. The island is exposed to ocean storms, and this makes the cultivation of the soil unprofitable; a few crops are raised in the sheltered localities. The chief industries are trade and fishing. San José is the only town. Its fixed population is about 500. The island was strongly fortified by the Spaniards in the 18th century, but the defenses were not well kept up. When Admiral Dewey entered Manila Bay 1 May 1898 he steamed past this island, which was supposed to be very strongly fortified and to be the base of operations for the mines and torpedoes in the bay. The forts have been strengthened by the United States government, which established a military station here in 1900.

CORREGIDOR, kō-rä-hē-dōr', in Spain, the principal magistrate of a town, appointed by the king. In Portugal the corregidor has administrative but not governing powers.

CORRESPONDENCE SCHOOLS, educational institutions that supply, in place of classroom work, such instruction by mail as may prove a most valuable substitute to those unable to attend the regular colleges or schools; and the statement has been made that, since the establishment of the correspondence system in the mining districts of Pennsylvania, many thousands of the men have secured through it such an education in the theory involved in their trades as to fit them for much higher positions than they could ever have attained without such education. The University Extension movement in England (1868) undoubtedly called attention to the latent possibilities in the plan and method developed in the United States about 15 years later, when the Correspondence University was founded at Ithaca, N. Y. Important service is ascribed to the correspondence method in connection with the Chautauqua "universal education" idea. Its most concrete manifestation, however, is to be sought in the achievements of the International Correspondence Schools at Scranton, Pa. Organized in 1891, these schools extended their usefulness and increased the enrolment very rapidly, until the latter embraced students in nearly every part of the world; the professions or branches taught ranging from architecture to advertising, from chemistry to window-trimming. Each school is in charge of a principal, who has under him assistant principals and a large force of examiners. See Education Supplimental.

CORRESPONDENCE TEACHING. See Home Education; University Extension; Correspondence Schools; Education Supplemental.

CORRÉZE, kŏr-räz', an inland department of south-central France. It is named from the river Corrèze. Area, 2,273 square miles; capital, Tulle. The surface is mountainous, especially to the north and east. The soil is far from fertile, except in a few of the valleys. Heaths occupy a great extent of surface and agriculture is in a very backward state. Hay is abundant and large crops of beet-root are grown, besides maize, barley, hemp, flax, etc., in moderate quantities. Minerals are plentiful, but little worked. The only manufactory of note is that of firearms at Tulle, employing about 1,000 hands. The trade is principally in horses, cattle, wood, nut-oil, bees-wax, leather, straw-paper, iron, etc. The department is divided into 3 arrondissements, 29 cantons and 287 communes. It forms the diocese of Tulle. Pop. 309,646.

CORRIB, Lough, lŏн kŏr'rĭb, a large lake, the second in size in Ireland, between Galway and Mayo, about 23 miles in length and varying from 2 to 6 miles in breadth, and composed of two expansions, united by a narrow channel, about half a mile wide at its narrowest part, across which is a ferry. It is about three miles distant from the sea at Galway, where it is only 14 feet above sea-level. It is separated from Lough Mask by a narrow isthmus, through which there is a subterranean channel. Corrib contains many islands and near it are prehistoric stone-circles. To the west are mountains 3,000 feet high. On its sides are metamorphic rock, carboniferous limestone and marble.

CORRIDOR (Italian and Spanish, "that which runs"), in architecture, a gallery or long aisle leading to several chambers at a distance from each other, sometimes wholly enclosed, sometimes open on one side. In fortification, corridor signifies the same as covert-way.

CORRIENTES, kŏr-rē-ĕn'tĕs, Argentina, a province bounded by Paraguay on the north, by the territory of Misiones on the northeast and the republic of Uruguay on the southeast, by Entre Rios on the south and the province of Santa Fé and the territory of Chaco on the west. Area, 48,357 square miles. The Paraná River forms its boundary on the west and north; the Uruguay River on the east; and there are other streams and lakes. Thus the soil is abundantly watered and well adapted to agriculture. Sugarcane, tobacco, cotton, wheat and maize are grown extensively; the value of the cattle and horses, however, is much greater than that of the crops, the proportion being about six to one. Its chief industries are shipbuilding, meat-curing and foundries. A railway runs diagonally through the province from the capital, Corrientes, in the northwest, to the southeastern towns on the frontier of Uruguay. The city was founded in 1588, and occupied a place of considerable prominence in the revolutionary movements during the latter half of the 19th century. Pop. about 277,000.

CORRIENTES, Argentina, the capital city of the province of the same name. It is situated on the left bank of the Paraná River, and for many years has been an active port for both steamers and sailing vessels. It has several plazas, hospitals for men and women, a national college, a normal school, a theatre and a library. The natural-history museum was at one time managed by the naturalist Bonpland. The city is the centre of a fertile district and has considerable trade in lumber and oranges. At several private shipyards near the city vessels are built of the wood brought from El Chaco, which is remarkably durable. There are also meat-curing establishments and a foundry. The city, founded in 1588, occupied a place of considerable prominence in the revolutionary movements during the latter half of the 19th century. Pop. 23,904.

CORRIEVRECKIN, kŏr-ri-vrĕk'ĭn, a noted strait and whirlpool on the west coast of Scotland, between the islands of Jura and Scarba. The breadth of the strait is about one mile, and because of the noise of the water rushing through it during storms the passage is terrifying, though not very dangerous.

CORRIGAN, Michael Augustine, American Roman Catholic prelate: b. Newark, N. J., 13 Aug. 1839; d. New York, 5 May 1902. He made his elementary studies in a private school in Newark and at the age of 14 was sent to Saint Mary's College, Wilmington, Del. In the spring of 1859 he was graduated from Mount Saint Mary's Emmitsburg, and in the fall of the same year entered the American College in Rome. He was the first student from the United States who asked for admission to this now famous college. At Rome in 1863 he was ordained a priest for the diocese of Newark, United States, but remained in Rome another year for further study. He began his duties in the Newark diocese (1864) and was soon appointed by his bishop as professor of dogmatic theology and sacred Scripture at Seton Hall Seminary, South Orange, N. J. As vacancies occurred in the seminary he was promoted until in 1868 he was made president of the institution. In 1873 he was elevated to the office of bishop of Newark, remaining at the head of this diocese for seven years. In its management his executive ability proved to be equal to his charity. He introduced religious communities, founded charitable institutions and greatly stimulated the religious life of his diocese. The number of organized parishes increased, and in 1880 he was called to the position of coadjutor of Cardinal McCloskey, archbishop of New York. In October 1880 he received the papal bulls appointing him archbishop of Petra and coadjutor to the archbishop of New York, with the right of succession. Upon the death of Cardinal McCloskey, Archbishop Corrigan became archbishop of New York, and the pallium was conferred upon him 4 March 1881. This charge he retained until his death. During the years he was at the head the diocese became one of the largest and most effective in the world. He became known through his many activities as one of the most prominent Roman Catholics in the United States. He was untiring and unobtrusive; a scholar of high attainments and spiritual power. Consult Mooney, J. A., 'Michael Augustine Corrigan; A Memorial' (New York 1902).

CORROBOREE, kŏr-ŏb-ō-rē' or kŏr-ŏb'ō-rē, the Australian name for a gathering of natives, either for religious or festive purposes. The characteristic feature of these assemblages is a peculiar dance to which the name corroboree is also applied. The gatherings are held on moonlight nights and generally last the whole night through. The men dance while the music is supplied by the women. The words accompanying the songs are made to suit the occasion. This ceremonial is the only great national institution in the primitive life of these people. Consult Roth, 'Ethnological Studies among the Northwest-Central Queensland Aborigines' (1897).

CORRODENTIA, a group of primitive insects allied to the orthoptera, discovered by Burmeister. The corrodentia, as recognized by Brauer, comprise the families *Termitidæ*, *Psocidæ* and the group *Mallophaga*, or biting-lice. It is not, however, a very natural assemblage of families and by Packard the corrodentia form a sub-order of his order *Platyptera*, including the stone-flies (*Perlidæ*), the *Psocidæ*, *Empidæ* and *Termitidæ*, or white ants (q.v.). Kellogg includes the *Psocidæ* and *Atropidæ*, or book-lice, and considers the family to be closely related to the *Mallophaga* in that both possess a peculiar hard plate in the pharynx. In all except the *Psocidæ* the body is flattened and the head extended horizontally. The prothorax is large, broad and more or less square, while the chest-pieces (*sterna*) are large and broad, and there are 8 to 11 segments in the abdomen.

CORRODI, kŏr-rō'dē, **August,** Swiss poet: b. Zürich, 27 Feb. 1826; d. there, 16 Aug. 1885. He studied theology but became a painter and from 1862–81 taught drawing in Winterthur. His first volume of 'Songs' (1853) exhibited graceful versification and deep sympathy with nature, while his songs and dramatic compositions in local dialect, 'Dur und Moll: Aus Natur und Leben' (1855); 'Waldleben' (1857); 'Der Herr Professor' (an idyll, 1858); 'Der Herr Vikari'; 'De Herr Dokter' (1860, dramatized by the author in 1872), had extraordinary success. Most of his works are distinguished by a fine, droll sense of humor. He illustrated several of his own books. He translated several of Burns' songs into the Swiss-German dialect and published 'Shakespeare: Life Wisdom from His Works.' His works are numerous and possess much merit.

CORROSION. See CORRASION.

CORROSIVE SUBLIMATE, also called mercuric chloride, $HgCl_2$, bichloride of mercury, perchloride of mercury; prepared by heating mercuric sulphate with dry sodium chloride; the mercuric chloride sublimes as a white transparent crystalline mass, having a specific gravity of about 5.43. It is soluble in about 20 parts of cold water and very soluble in alcohol and ether. It precipitates albumen, hence white of egg is an antidote. It is very poisonous, and is used to preserve both animal and vegetable substances. It is used in pharmacy as *Liquor hydrargyri perchloridi,* and as *Lotio hydrargyri flava* when mixed with lime. Corrosive sublimate is a powerful irritant and is used externally in skin diseases. It is administered internally in syphilis, usually in conjunction with iodide of potassium. It is also much in use by surgeons in an antiseptic spray and as a cleansing agent for sterilizing their operating instruments. When used as an antiseptic wash for wounds or sores one part of the salt is usually dissolved in from 2,000 to 5,000 parts of water.

CORROSIVES (Lat. *corrodere,* "to eat away"), in surgery, medicines which corrode whatever part of the body they are applied to; such are glacial acetic acid, burned alum, white precipitate of mercury, white vitriol, red precipitate of mercury, butter of antimony, etc.

CORRUGATED IRON, sheet iron formed with parallel ridges and furrows, so that the cross-section is a continuous waved line. Flat sheet metal tends to buckle and get out of shape with every change in temperature. The corrugations, made in one direction, give it greatly increased stiffness and adapt it to numerous purposes for which it would otherwise be less suitable. The sheet metal is corrugated by passing between ridged rollers, whose ridges are opposed like the teeth of gear-wheels. It comes out in the commercial form, and is frequently subjected to a process of coating with zinc, to protect it from oxidation, and is then known as galvanized corrugated iron.

An important use of corrugated iron is for the flues of large steam boilers. For this purpose mechanism has been devised for forming the metal into annular corrugated flue pipes which present greatly increased resistance to collapse over the plain form. The heating surface is materially increased by the corrugations. Later, a flue was manufactured with spiral corrugations, giving increased strength. This material has also found an extensive use in the construction of cheap partitions, walls and roofs of temporary structures, and for buildings where utility is more valued than ornament.

CORRUPT PRACTICES ACTS. The effort to eliminate dishonest, irregular and criminal methods of influencing public elections has resulted in the enactment of various laws to supplement the common law against bribery and corruption (see BRIBE). Such acts enumerate and define the corrupt or illegal practices and fix penalties for the same; they usually include bribery in any form, treating, undue influence, intimidation, personation of voters or aiding and abetting in the same, the making of false election returns, the solicitation of candidates for campaign contributions — save by political committees — the contributing of campaign funds to other than authorized agents, the making or receiving of campaign contributions under an assumed name, the rendering of a false declaration of election expenses, etc. Many laws forbid the acceptance of campaign contributions from certain sources, especially from corporations and from assessments levied on officeholders in the civil service.

British Acts.— Statutes to prevent bribery and corruption have been passed in 1729, 1809, 1827, 1842, 1854, 1868 and 1883. The most important of these are the Corrupt Practices Prevention Act of 1854 (which repealed all previous legislation and dealt especially with the practice of electoral bribery), the Parliamentary Elections Act of 1868 and the Corrupt and Illegal Practices Prevention Act of 1883, which incorporated the act of 1854. The act of 1883 defines and fixes the penalties for the criminal offenses classed as corrupt practices, which consist of bribery of seven different varieties, treating, undue influence and personation, all of which are punishable by fine or imprisonment and by loss of political rights for seven years. If a candidate for a seat in Parliament be found guilty by a trial court of committing or consenting to corrupt practices, his election is void and he is forever debarred from representing the district in Parliament; but should only his agent be proved guilty of corrupt practices, the candidate, though personally innocent, may not be elected for the same constituency for a period of seven years. The sections of the act relating to illegal practices as distinguished from "corrupt" practices are intended to limit election expenses. For boroughs of 2,000 voters the maximum expenditure is fixed at £350 while £650 is allowed for counties with the same number of voters with an extra allowance for each additional thousand in the district. The legal expenditures are enumerated, such as printing and meeting halls, etc., and the number of paid agents is limited. Within 35 days after the election the candidate's agent must file a statement of expenses, certified by the candidate. The corrupt practices law applies equally to parliamentary, municipal, county and parish council elections, and the punishments provided for minor officials correspond with those imposed on parliamentary candidates; a municipal candidate personally guilty of corrupt practice is forever incapable of holding office, but if guilty merely through acts of his agents he is incapacitated only for three years.

United States Acts.— The Federal government has legislated less regarding corrupt practices than the States, since the latter control most of the election machinery. In 1907 Congress passed an act forbidding corporations to contribute to campaign funds in Federal elections; on 25 June 1910 an act was approved providing for publicity of political contributions, requiring each political committee to file a financial statement within 30 days after a national election, and on 19 Aug. 1911 an act amending this act was approved extending its provisions to individual candidates as well as to committees. Candidates for the House of Representatives are allowed to expend a maximum of $5,000 and for the Senate of $10,000. The candidates for the lower house must file with the clerk not less than 10 nor more than 15 days prior to the election (whether it be a primary election, a nominating convention or a general election) a preliminary itemized statement of receipts and their sources and of expenditures and their objects, besides the more complete statement to be filed within 30 days after the election. The act provided that senatorial candidates must file with the secretary of the Senate (not less than five nor more than 10 days prior to the day on which the State legislature first ballotted for such candidate) a similar itemized statement of receipts and expenditures, but since 1913, when the Seventeenth Amendment to the Constitution, providing for direct election of Senators, was declared in force, senatorial candidates follow the practice of the Representatives.

All the States and Territories have enacted corrupt practices acts of some sort. The earlier laws related chiefly to bribery, betting on elections, etc., but the latest laws so carefully regulate expenditures by party candidates and committees and define legal and illegal practices with such particularity that few loopholes exist for «honest graft,» the most tempting opportunity for evading the law being furnished by the allowances for «necessary personal expenses» (comprising expenditures for traveling, stationery, postage, express, telephone and telegraph services, etc.), which need not be included in the financial statement. Hence only slight limitations are imposed on the candidates.

New York was the first State to legislate against corrupt practices at elections, passing an act in 1890 requiring candidates to file itemized statements of expenditures on pain of imprisonment and loss of office. As the operations of political committees were not restrained by this law, the defect was remedied by a supplementary law providing that within 20 days after the election the treasurer of such committee shall file an itemized statement giving amounts of contributions with names of donors and details of all expenditures over $5 with the objects and names of persons to whom payment was made. Bribery, personation, illegal registration, the use of false naturalization papers and the aiding of another to do so are punishable by imprisonment not exceeding five years, while giving a bribe also disqualifies for holding office and receiving a bribe disfranchises for five years. Illegal primary voting is a misdemeanor as is making a false declaration of party affiliation. The amounts that candidates for various offices may spend are carefully listed, graded and defined, as are also the legitimate expenses that may be incurred by all others connected with the elections. In 1909 New York also prohibited all corporations, save political associations, to make campaign contributions or to expend money for any political purpose whatsoever, and an officer, stockholder or agent of any corporation guilty of such practice may be imprisoned for one year and fined a sum not exceeding $1,000. Candidates may not be solicited for contributions nor are judicial candidates allowed to donate. The influencing of voters by promising employment or office was first prohibited by Massachusetts, which State also forbids the publication of unsigned political advertisements, the subsidizing of newspapers to favor a particular candidate, the contributing of funds to political parties by certain corporations and the payment of naturalization fees by political committees.

Several States prohibit electioneering on election day and the giving away of liquor within a certain distance of the polling places, and a few States now bear a part of the election expenses. Oregon limits the amount to be expended on an election and pays part of the expenses of informing voters about candidates and parties. In 1909 Colorado provided that only the State and the candidates should pay the expenses of electing State, district and county officers at general elections. Each political party receives from the State 25 cents for every vote cast for governor by that party in the preceding election, the money being paid to the State chairman who is bonded to guarantee the legitimate use of such funds and also to vouch that one-half of the sum received by him is distributed among the county chairmen. Candidates may personally contribute a sum regulated in accordance with the amount of the prospective salary or fees. Other persons or corporations contributing to any party candidate or committee or receiving such contributions are guilty of felony. In 1915 Nevada limited the expenditures of any party to $15,000 during one campaign. In the same year Kansas prohibited a candidate from spending more than 10 per cent of the office salary for the first year, his expenses not including travel. This State also forbids any candidate or organization to provide conveyances to take voters to the polls. California penalizes frauds in connection with initiative, referendum and recall petitions, making such practice a felony punishable by imprisonment from one to 15 years. Most of the States require the publication of financial statements at specified intervals before election day and complete sworn statements within a certain time after election, various penalties being imposed for failure to comply. Nebraska requires not only the itemized statement to be issued 15 days before election but also daily reports thereafter until election of all contributions over $25. In 1911 Indiana provided that candidates must conduct their financial operations through «political agents» to prevent the irresponsible distribution of political funds. South Dakota requires a secretary for each political committee who must receive all contributions, transfer them to the treasurer and approve all vouchers before the latter officer may expend the funds. Most States require that these statements be open to public inspection. See BALLOT; BRIBE; ELECTIONS; LOBBY; UNITED STATES — THE NEW DEMOCRACY AND THE SPOILS SYSTEM.

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CORRUPTION OF BLOOD, in law, the incapacity to inherit, or pass an inheritance, in consequence of an attainder to which the party has been subject. In the United States it was abolished by the Federal Constitution. See ATTAINDER; FORFEITURE.

CORRY, Pa., city in Erie County, about 26 miles southeast of Erie, on the Erie, the Philadelphia and Erie and the Western New York and Pennsylvania railroads. It was settled in 1860, and developed rapidly because of the petroleum deposits which underlie the city and vicinity. It has varied manufactures of iron wares, flour and feed mills, brick works and manufactures of tram locomotives, stationary, gas and steam engines, leather goods, corsets, furniture, radiators, shovels, wrenches, brushes, toys, etc. It has also extensive dairying interests. It has several mineral springs, and is the location of the State fish hatchery. The city adopted the commission form of government in December 1913. Pop. 5,991.

CORSAC, kôr'săk, or **ADIVE** (*Vulpes corsac*), a species of fox or dog found in Central Asia, Siberia and Mongolia, sometimes called the steppe-fox. Its color varies from reddish-yellow in summer to a whitish tinge in winter. The Kirghiz hunt the corsac for its soft, thick, warm fur. About 50,000 pelts come to market annually. It is gregarious, prowls by day, burrows and lives on birds and eggs. The corsac stands captivity well and is often seen in zoological gardens. It is much like the American kit-fox (q.v.) in its habits.

CORSAIR, kôr'săr (Fr., in origin identical with "courser" or "cruiser"), a term employed to denote pirates or their vessels. By the princes of the coast of Barbary the corsairs of their states were commissioned to attack the merchant ships of foreign nations, and they became the scourge of the Mediterranean. See BARBARY POWERS.

CORSAIR, The, a poem by Lord Byron, published in 1814. The romantic adventures of the hero are continued in 'Lara.'

CORSE, kôrs, **John Murray**, American military officer: b. Pittsburgh, Pa., 25 April 1835; d. Winchester, Mass., 27 April 1893. He was a cadet at West Point for two years, and in 1860 became a lawyer, but enlisted in the Union army at the outbreak of the Civil War. He was a brigadier-general in 1864; commanded a division in Georgia, and upon the advance of the Confederates against Allatoona, Sherman heliographed him, "Hold the fort for I am coming," which inspired Ira D. Sankey to compose the famous hymn beginning with these words. General Corse repulsed the enemy and accompanied Sherman on the march to the sea. After the war he was successively collector of internal revenue in Chicago and postmaster of Boston.

CORSET, an article of dress worn generally by women for the purpose of keeping the form erect and trim. It is usually made of two thicknesses of white jean, stiffened by whalebone or steels, closed in the front by heavier steels and laced at the back. It was in use in Germany in the Middle Ages, and was introduced into France about the time of the Revolution. At an early age it was in use in Great Britain and Ireland, at least in the 18th century, and was worn by little girls as a support for the body. The styles of corsets have changed with the styles of dress, the modern tendency being to emphasize the natural figure. Corset manufacture in the United States has increased rapidly since 1899.

CORSICA (Fr. *Corse*), an island in the Mediterranean belonging to France. It is separated from the island of Sardinia, on the south, by the Strait of Bonifacio, about 10 miles wide, and its shortest distance from the mainland is 50 miles. It is distant from France about 100 miles. It is somewhat irregular in shape, but tolerably compact, except toward the north, where it terminates in a long and narrow tongue of land about 22 miles long by about six miles broad. Greatest length, north to south, 110 miles; greatest breadth, near its centre, 53 miles; area, 3,367 square miles. The east coast is remarkable for its uniformity, presenting a line which is broken in only one or two places by comparatively small indentations. To this the west coast presents a striking contrast, a number of deep bays following each other in rapid and almost uninterrupted succession. Of these the most important, proceeding north to south, are the gulfs of Saint Fiorenzo, Calvi, Porto, Liscia, Ajaccio and Valinco. The interior is traversed by a mountain chain, which has its principal direction north to south, but throws out several lateral branches, particularly to the northwest. The highest summits are near the centre of the island, including Monte Cinto, 8,881 feet, and Monte Rotondo, 8,612, while others exceed considerably 7,000 feet and the greater part of the year are covered with snow. The mountain masses are chiefly composed of granite and porphyry, and appear to be generally overlaid by extensive beds of limestone. From the east and west sides of the chain numerous streams descend to the opposite sides of the coast. They are mere torrents, short and rapid, and altogether unfit for navigation. The largest are the Golo and Tavignano. Along the river mouths large quantities of débris and alluvium have accumulated which, preventing the egress of the waters, have gradually formed on the east coast a series of lagoons and morasses and made that part of the island very unhealthy; but with this exception the climate is one of the finest in Europe. The heat is sometimes excessive, but the sky is generally clear and the air bracing. The summits of its many lofty mountains are covered with pines, evergreen oaks, cork-trees, beeches and chestnuts. In other parts the hillsides are overgrown with dense thickets of cistus, myrtles, arbutus and other shrubs. Numerous valleys lie between the lofty ridges, and sometimes plains of considerable extent occur, the soil of which is generally fertile and well adapted for the growth of all the ordinary cereals. Agriculture is in a backward state, and the island produces scarcely a sufficient amount for local consumption. Large tracts of land are uncultivated; the farming implements in use are of the crudest form. The slopes are covered with vineyards, and the olive trees appear to be indigenous. The mulberry, orange and citron succeed well, particularly in the lower valleys near the coast. One of the most valuable productions of the more elevated districts is the chestnut, on which, at least during the winter months, the poorer inhabitants principally subsist. Among domestic animals, the first place, for usefulness and numbers is due to mules and goats. The principal wild animals are the boar and the fox. Deer are numerous and all the smaller game and wild fowl are common; eagles, vultures and numerous other birds of prey frequent the mountains, and fish abound. The principal source of mineral revenue is derived from quarries of fine granite, porphyry and marble. Neither manufactures nor trade have made much progress. The chief exports are wine, brandy, olive-oil, chestnuts, fruit and fish. The inhabitants have the reputation of being haughty in temper, passionate and revengeful. Corsica is one of the countries in which the *vendetta* obtains, the taking of private vengeance for the blood of a relative, of which a striking picture is to be found in Merimée's 'Colomba.'

From the Phœnicians, its first colonists, the island took the name of Cyrnos; and from the Romans that of Corsica. On the decline of the Roman empire it was seized by the Goths and passed from them to the Saracens. In 1481 it fell under the dominion of the Genoese, who retained it, with some interruption, till 1755, when a great part of it was wrested from them and made independent by the celebrated General Paoli. France, claiming it on a pretended cession by the Genoese, obtained forcible possion of it in 1768, after the inhabitants had distinguished themselves by a long and valiant resistance. At the time of the French revolution, Paoli, who had taken refuge in England, returned to his native land, and unfurling the banner of the death's head (the old Corsican arms), he summoned his countrymen to strike for their independence. With the assistance of the British, who landed 18 Feb. 1794, he reduced Bastia in May and Calvi in August. Corsica was constituted a kingdom under the government of a viceroy (General Elliot); the constitution and laws of Great Britain were adopted, and a parliament such as Ireland had was established. But a large part of the people were averse to the British, whom they regarded as heretics, and the French party again appeared on the island in October 1796, under General Gentili. Sickness had reduced considerably the effective force of the British, and their position was rendered still more critical by the French occupation of the neighboring city of Leghorn, and in consequence they evacuated Corsica. In 1814 it was again in British occupation. Since 1815 the island has formed a French department. For administrative purposes the department is divided into five arrondissements — Ajaccio (the capital), Bastia, Calvi, Corte and Sartene, subdivided into 62 cantons and 364 communes. The most distinguished individuals to whom Corsica has given birth are Paoli and Napoleon. Pop. 288,820. Consult Caird, 'The History of Corsica' (1899).

CORSICANA, kôr-sĭ-kā'nạ, Tex., city, county-seat of Navarro County; on the Houston and Texas and the Saint Louis Southwestern railroads, 180 miles northeast of Austin. The city is the seat of the State Orphans' Home and the Odd Fellows' Widows and Orphans' Home, a Carnegie library, sanitaria, a fine courthouse, Federal and high school buildings, a natatorium and an Elks' home. Corsicana is a progressive manufacturing centre, having among its industries large cotton mills, gins and compresses, sheet-metal works, broom, harness, candy, overall and soda water factories, cotton-seed-oil mills, brickyards, flour mills, a grain elevator, foundry and machine shops, planing mills, etc. It is also the seat of an extensive oil industry, there being in its vicinity a number of wells, oil machinery factories and two large refineries. The sewage system is owned by the city. It also has street railways, waterworks, daily and weekly newspapers and three national banks. Pop. 10,000.

CORSINI, kôr-sē'nē, **FAMILY,** a famous Florentine family, known since the 13th century. (1) André, Saint: b. Florence, 30 Nov. 1302; d. Fiesole, 6 Jan. 1373. He early entered a monastery in Florence, where he remained for 40 years; he was then made bishop of Fiesole and sent as a papal legate to Bologna, where he was successful in making peace between factions and putting an end to civil war. (2) Lorenzo became Pope as Clement XII (q.v.). He restored the Corsini Palace in Rome now containing the interesting Corsene Gallery. (3) Tommaso, Italian politician: b. Rome, 5 Nov. 1767; d. there 1856. He was a supporter of Pope Pius IX and was made senator (chief magistrate) of Rome; when the Pope fled from Rome, Corsini went to Florence for a time, but later returned to Rome. (4) His brother Neri: b. 1771; d. 1845, was a member of the council in Tuscany under the grand dukes Ferdinand III and Leopold II. (5) Neri, Italian politician: b. Florence, 13 Aug. 1805; d. 1 Dec. 1859. He was the younger son of Thomas Corsini and became one of the leaders of the Liberal party in Tuscany. In 1848 he was Minister of War and Foreign Affairs; later the Grand Duke Leopold II offered him the first place in the ministry and he immediately proposed to establish the constitution. The duke, however, would not consent to this and went into exile. The provisional government then organised sent Corsini to London to represent Tuscany there.

CORSNED, kôrs'nĕd, or **MORSEL OF EXECRATION,** a form of trial or purgation formerly made use of in England. See Ordeal.

CORSO, an Italian term first applied to races of riderless horses, then to the long lines of gaily decorated carriages driven through the principal streets of the cities, and afterward to the most fashionable carriage-drive in the city. The Corso at Rome, stretching from the Piazza del Popolo to the Capitol, and dividing the city into two equal parts, is nearly 3,500 paces in length, and is enclosed by high and mostly splendid edifices; but its breadth is not proportionate; so that in most parts not above three carriages can go abreast. The higher class of citizens take the air in carriages, which form a very long row. This evening promenade, which in all large Italian cities is splendid, and is imitated in very small towns (although it may have only a few coaches), attracts great numbers of spectators on foot. The carnival is the gayest of the festivals, and at this time the Corso appears in its greatest splendor. Goethe has written a description of the Roman carnival and the Corso. See CARNIVAL.

CORSSEN, kŏrs'sĕn, **Wilhelm Paul,** German philologist: b. Bremen, 20 Jan. 1820; d. Berlin, 18 June 1875. After studies in philology at Berlin, and two years spent in teaching at Stettin, he was called in 1846 to lecture at Schulpforta, where he remained till 1866, when ill health compelled him to retire. His earliest important work is his treatise, 'Über Aussprache Vokalismus und Betonung der lateinischen Sprache' (1858–59), for which he received the prize offered by the Royal Prussian Academy of Sciences for the best work on that subject. It was followed by 'Kritische Beiträge zur lateinische Formenlehre' (1863); 'Kritische Nachträge' (1866); 'Über die Sprache der Etrusker' (2 vols., Leipzig 1874–75), in which he labors with great ingenuity and vast learning to prove against the world that the Etruscan language was cognate with that of the Romans. His arguments were violently opposed by the classical students everywhere, especially by Wilhelm Deecke, 'Corssen und die Sprache der Etrusker, eine Kritik' (Stuttgart 1875).

CORT, kôrt, **Cornelius,** Dutch engraver: b. Hoorn 1536; d. Rome 1578. In his youth he worked for a printseller at Antwerp. He then went to Venice, where he was warmly welcomed by Titian, some of whose pictures he was employed to engrave. Cort finally settled at Rome and established a school of engraving there, and it is said had Agustino Carracci for a pupil. He made the first engraving of the 'Transfiguration' by Raphael, and about 150 prints from the other Italian and Flemish masters, including the two Zucchari, Miziano, the miniature painter Clovio and Michelangelo. His work was not superseded until the advent of Goltzius. This number, considering the shortness of the engraver's life, and the size and fine style of the plates, betokens a considerable amount of industry; but although he had a complete mastery of the graver, he is reproached with deficiency in discriminating delicate shades and relative distances, or the nice varieties of expression. Consult Longhi, 'Calcographia' (Milan 1830), and Bartsch, 'Anleitung zur Kupferstichpunde' (Vienna 1821).

CORT, Frans de, Flemish poet: b. Antwerp, 21 June 1834; d. near Brussels, 18 Jan. 1878. As singer of the quiet joys of home life and conjugal happiness he has few peers in any literature. He was at first associated with the publication *Grondwet*, and was later appointed editor of the *Schelde* (1858). He was secretary to the general auditor of the military court at Brussels from 1861 until his death. His original homely lyrics appeared in 'Liederen' (1857–59); 'Zing-Zang' (1866); and a second volume of 'Liederen' (1868). He also translated into Flemish verse 'The Finest Songs of Robert Burns' (1862); as well as those of Jasmin and German verse. After 1861 he conducted the periodical *De Toekomst*. In 1869 he edited the posthumous poems of Dautzenberg, his father-in-law.

CORT, Henry, English inventor: b. Lancaster 1740; d. 1800. Having at an early age conceived the idea of making England independent of foreign countries for the supply of iron, he established himself as an iron merchant at Gosport, Hampshire, and afterward erected iron works at Fontley, near that town, where he expended large sums in perfecting his processes for puddling and rolling iron. His experiments were successful, in spite of the most disheartening opposition of the most powerful iron-masters of England. He took into partnership Adam Jellicoe, chief clerk in the office of the paymaster of the navy, but after his partner's death the navy board seized his iron works for claims against Jellicoe, involving Cort in law suits, and eventually in total ruin. After his death, the members of his family received insignificant pensions from the government. To him England owes its success in the manufacture of pig-iron. In 1740 the production amounted to 48,000 tons, while in 1913 it had increased to 15,997,328 tons. He is now commonly styled «the father of the iron trade,» though Dud Dudley, whose 'Metallum Martis' was printed in 1665, has a much better claim to the title.

CORTE, Corsica, the capital of an arrondissement, at the confluence of the Tavignano and Restonica, 52 miles northeast of Ajaccio by rail, picturesquely situated among the mountains and protected by a commanding citadel which has sustained many notable sieges. Corte was the seat of Paoli's reform government. A university founded by that patriot bears his name; a communal college, an ancient palace, from which Paoli ruled, and an old Franciscan monastery which served as the parliament house in 1765, and the house in which Paoli lived also remain. There are monuments to Paoli, General Gaffori and General Casanova, Duke of Padua. Marble is quarried extensively in the neighborhood; lumber, wine, oil and cheese are the staple products. Pop. 5,211.

CORTELYOU, George Bruce, American cabinet officer: b. New York, 26 July 1862. He was graduated from the Hempstead, Long Island, Institute, 1879, and the State Normal School, Westfield, Mass., 1882. Between 1883 and 1885 he was a general law and verbatim reporter in New York; and a teacher 1885 to 1889, when he entered the public service. He was private secretary to various Federal officials in New York 1889–95; was appointed stenographer to the President November 1895; executive clerk February 1896; assistant secretary 1898 and became secretary to President McKinley 1 May 1900. President Roosevelt continued him in this office until 1903 when he became Secretary of Commerce and Labor. On 6 March 1905 he became Postmaster-General and on 4 March 1907, Secretary of the Treasury. In 1909 he became president of the Consolidated Gas Company.

CORTERREAL, kŏr-tā-rā-äl′, **Gasper,** Portuguese navigator: b. about 1450; d. about 1502. In 1500 he was appointed by the king of Portugal to command an expedition to explore the northern coasts of North America. He sailed from the Tagus in 1500 with two ships, ranged the shores of the country afterward called Canada and freighted his ships with 57 Indians, whom on his return he sold as slaves; and the name Labrador (laborer), afterward transferred to a more northern region, is a memorial of his visit. Soon after he set sail from Lisbon on a second voyage to the same regions, but never returned. His brother Miguel, who sailed in search of him in 1502, was never afterward heard from. King Manuel sent an expedition to learn their fate but in vain. Consult Harrisse, ‹Les Corterreal et leurs voyages au noveau monde› (Paris 1883).

CORTÉS, or **CORTÉZ,** kôr-tās′, **Hernando, Hernan,** or **Fernando,** Spanish conqueror of Mexico: b. Medellin, Estremadura, 1485; d. Castillejo de la Castra, near Seville, 2 Dec. 1547. He entered the University of Salamanca, but his penchant for the fair sex soon led to his expulsion and the same cause led to his resolution to leave Spain and try his fortune in the New World. He went to the West Indies in 1504, where Velasquez, governor of Cuba, gave him the command of a fleet, which was sent on a voyage of discovery. Cortés quitted Santiago de Cuba 18 Nov. 1518, with 11 vessels, about 700 Spaniards, 18 horses and 10 small field-pieces, and landed on the Mexican coast. The sight of the horses on which the Spaniards were mounted; the movable fortresses in which they had crossed the ocean; the iron which covered them; the noise of the cannon;— all these objects alarmed the natives; and the adventurer by his address gained over the Totonacs and Tlaxcalans, who were his faithful allies to the last. To keep in check another tribe he built a fort and a few houses, which formed the nucleus of the city of Vera Cruz, and in order to prevent the desertion of his soldiers, and to give them the courage of despair, he caused his little fleet to be destroyed. Cortés entered the city of Mexico 18 Nov 1519. Montezuma, the sovereign of the country, received him as his master; and the inhabitants, it is said, thought him a god and a child of the sun. He destroyed the idols in the temples, to whom human sacrifices were offered, and placed in their room images of the Virgin and of the saints. In the meantime he made continual progress toward getting possession of the country, forming alliances with several caciques, enemies to Montezuma, and assuring himself of the others by force or stratagem. On a general of Montezuma attacking the Spaniards, in obedience to a secret order, Cortés repaired to the Imperial palace, had the commander and his officers burned alive, and forced the emperor, while in chains, to acknowledge publicly the sovereignty of Charles V. The unhappy monarch added to this homage a present of a large quantity of pure gold, and a number of precious stones. But the jealousy of Velasquez was so much excited by the deeds of his representative, that he sent an army numbering about 1,400 against him. Cortés, with a force not more than 250 strong, advanced to meet it, gained over the soldiers who bore arms against him, and with their assistance again made war with the Mexicans, who had also revolted against their own emperor, Montezuma, whom they accused of treachery. After Montezuma, who had hoped to restore tranquillity by showing himself to the multitude, had fallen a victim to their rage, Guatimozin, his nephew and son-in-law, was acknowledged as emperor by the Mexicans, and gained some advantage over the Spaniards. He defended his capital during three months, but could not withstand the Spanish artillery. Cortés again took possession of Mexico, and in 1521 the emperor, the empress, the ministers and the whole court were in his power. The unhappy Guatimozin was subjected to tortures to make him disclose the place where his treasures were concealed, and was afterward executed with a great number of his nobles. The court of Madrid now became jealous of the power of Cortés, who had been some time before appointed captain-general and governor of Mexico. Commissioners were sent to inspect and control his measures; his property was seized; his dependents were imprisoned, and he repaired to Spain. He was received with much distinction, and returned to Mexico with an increase of titles, but a diminution of power. A viceroy had charge of the civil administration, and Cortés was entrusted only with the military command and the privilege of prosecuting his discoveries. The division of powers proved a constant source of dissension; and though he discovered the peninsula of California in 1533, most of his enterprises were frustrated, his life embittered and he returned again to Spain, where he was coldly received and neglected. He followed Charles V in his unfortunate expedition against Algiers in 1541 and gave signal proofs of his valor, yet the monarch continued to refuse him admission to the court. It is said that one day, having forced his way through a crowd round the carriage of his king, and put his foot on the step to obtain an audience Charles coldly inquired who he was. «I am a man,» replied Cortés, «who has gained you more provinces than your father left you towns.» He passed the remainder of his days in solitude, leaving a character eminent for bravery and ability, but infamous for perfidy and cruelty. Consult Antonio de Solis, ‹Historia de la conquista de Méjico› (Madrid 1684; and a popular edition in 5 volumes, Paris 1827); MacNutt, F. A., ‹Fernando Cortés and the Conquest of Mexico 1485–1547› (New York 1909); id., ‹Letters of Cortés to Charles V, Translated and Edited, with Biographical Introduction and Notes› (2 vols., New York 1908); Ober, ‹Hernando Cortéz› (New York 1905); Prescott, ‹Conquest of Mexico›; Helps, A., ‹Life of Cortez› (London 1871).

CORTÉS, José Domingo, Chilean journalist and historical writer: b. about 1830; d. 1882. After some years spent in journalism he was for a time an attaché at Brussels, and subsequently a government director of libraries in Bolivia. He was a prolific author and among his works are ‹Diccionario biografico americano›; ‹Poetas americanos›; ‹Historia de Bolivia›; ‹Estadistica bibliografia de Bolivia,› and ‹República de Méjico› (1872).

CORTES, kôr′tĕs, the old assembly of the «estates» in Spain and Portugal, the representatives chosen by the «estates» to assist in the making and administering of the laws of Spain and Portugal. In Spain the cortes of Castile, which was composed of the higher nobility, the superior ecclesiastics, the knights of the orders of Saint James, Calatrava and Alcantara and the representatives of certain cities held the first rank during the time of the united Spanish monarchy. In early times the king was very dependent upon the cortes; indeed, they were invested with the power of making war and frequently exercised it in opposition to the throne. In the original constitution of Aragon the form of government was very remarkable, a supreme judge, called the *justicia*, selected from persons of the second class, presided over the administration of the government. He decided all questions and disputes between the king and his subjects, and confined the royal power within the constitutional limits. King Ferdinand of Aragon and Isabella of Castile succeeded in rendering themselves independent of the «estates» (*las cortes*); and afterward, when the Castilians dared to resist an unconstitutional tax at a meeting convoked at Toledo by Charles in 1538 the king abolished this assembly of the «estates.» After this neither the clergy nor nobility were assembled. Deputies from 18 cities were sometimes, however, convened, but this only in case subsidies were to be granted. Philip II restrained the liberties of the Aragonese in 1591. After the Spanish war of succession Philip V deprived those provinces which had adhered to the Austrian party of the privileges that still remained to them. From that time the cortes were convened only to pay homage to the king or the Prince of Asturias, or when a question respecting the succession to the throne was to be determined. But when Napoleon attempted to extend his influence over Spain he convoked (15 June 1808) a junto of the cortes at Bayonne. In their last session, 7 June 1812, a new constitution was adopted by them. The ninth article regulated the powers and duties of the cortes, and provided that they should consist of 25 archbishops, 25 nobles and 122 representatives of the people. Napoleon afterward attempted, by offering to restore the cortes to their ancient importance, to gain over the Spanish nobility, and through them the people, but failed. The constitution of 1826 was suppressed; but it was restored by Dom Miguel in 1842. The constitution of the Republic (21 Aug. 1911) provides for a cortes consisting of two bodies, an upper and a lower house. The former is chosen by the municipalities and the latter by the people; and the two jointly elect the president for a term of four years. The Portuguese cortes is coeval with the monarchy. In 1143 the assembly at Lamego was asked to confirm the elevation of Alphonso I to the throne, and replied: «We resolve that he shall be king during his life, and his children after him.» The general prosperity of the country made the people less interested in the cortes, their representatives; and the kings, elated with success, paid attention to them only when in need of money. Dom Pedro formulated a new constitution in 1826, called the cortes together and abdicated in favor of his daughter, Maria da Gloria. In 1828 Dom Miguel assembled the cortes, in order to be acknowledged by them, and to give his usurpation an appearance of legitimacy. Consult Colmeiro, ‘Cortes de los antiguos reinos de Leon y de Castilla’ (Madrid 1883–84); Desdevises du Dezert, ‘L'Espagne de l'ancien régime’ (Paris 1897–99); Muro y Martinez, ‘Constituciones de España’ (Madrid 1881); Prescott, ‘Ferdinand and Isabella’; Stephens, ‘Portugal’ (in the ‘Stories of the Nations Series’). See PORTUGAL; SPAIN.

CORTEX, that portion of an organ usually situated on the outside. Thus the cortex of the brain is the external gray portion in which most of the nerve cells are located.

CORTHELL, Elmer Lawrence, American engineer: b. South Abington (now Whitman), Mass., 30 Sept. 1840; d. Albany, N. Y., 16 May 1916. He was educated at Phillips Exeter Academy and at Brown University. In his second year at Brown University the Rebellion broke out and he enlisted in the First Regiment, Rhode Island Light Artillery, rising from private to captain during the war. Then he re-entered Brown, obtaining successfully the degrees of B.A., M.A., and in 1894 Sc.D. He took up engineering work, mainly in the Mississippi Valley. After engaging in railroad and bridge construction requiring great skill, he was associated in 1875 with James B. Eads in building the jetties at the mouth of the Mississippi River. Among the many engineering projects in which he participated were the planning with Captain Eads of the ship railway across the Isthmus of Tehuantepec; the building of several large bridges over the Missouri, Ohio and other rivers; the opening of the Amazon River and the designing of the harbor works at Tampico, which raised that port to the first rank in Mexico and which he considered his greatest feat. He was consulting engineer of the Department of Public Works in the Argentine government from 1900 to 1902, represented that country and the United States in various engineering and navigation congresses of an international character, and was a member of the advisory board of consulting engineers for the New York barge canal. Besides being president of the American Institute of Consulting Engineers and of the Society of Civil Engineers he belonged to almost every engineering society of importance in the world and to various patriotic organizations. Consult ‘History of the Mississippi Jetties’ (1880); ‘Report on Brussels Navigation Congress’ (1898); ‘Maritime Commerce of the World’ (1898); ‘Some Ports of the World’ (1901); ‘Argentine, Past, Present and Future’ (1903); ‘Allowable Pressure on Deep Foundations’ (1907); ‘Engineering and Commercial Conditions and Problems in Latin America’ (1911).

CORTINA, Juan Nepomucena, nā-pō-moo-chā'nā kôr-tē'nā, Mexican adventurer: b. 1830. He took an active part in the Mexican war, organizing a band of independent guerrillas, which later became a part of the national army, and with their commander took part in many of the battles of that contest. After the war he became a general in some of the revolutionary risings, and in 1859 set himself up as an independent ruler along the border line between the United States and Mexico, where he held sway from 1859 until 1863. He became an adherent of the unfortunate Maximilian, and after his execution again joined the national party, and received his office from President Juarez. In 1876 he was arrested and General Diaz ordered his execution, but he was shut up in a military prison instead. No record of his death appears.

CORTISSOZ, Ellen Mackay Hutchinson, American journalist and author: b. New York. She is on the literary staff of the New York *Tribune*, with which her husband, Royal Cortissoz, is also connected as a literary and art editor. She is the author of 'Songs and Lyrics' (1881), and with E. C. Stedman edited the 'Library of American Literature' (11 vols., 1888–94).

CORTLAND, N. Y., city, county-seat of Cortland County; situated on the Tioughnioga River and the Lackawanna, the Lehigh Valley and the Erie railroads, about 38 miles northwest of Binghamton. It is a farming and manufacturing trade centre, and has several wire-works, foundries, machine shops and manufactories of carriages, stoves, harness, furniture, cash registers, corundum wheels, motor trucks, piano cases, wall paper and steel ware. The United States census of manufactures for 1914 recorded for the city 59 industrial establishments of factory grade, employing 2,752 persons; of which number 2,459 were wage earners, receiving annually $1,474,000 in wages. The capital invested aggregated $5,577,000, and the year's output was valued at $6,438,000; of this, $879,000 was the value added by manufacture. The city has electric lights and railways, several churches, a State Normal school, daily and weekly newspapers and three national banks. The government, under a charter of 1900, is vested in a mayor, a municipal council and administrative boards and officials appointed by the executive, the appointments, except the board of education, being subject to the consent of the council. First settled in 1792, Cortland was included in the township of Homer until set off as Cortlandville in 1829. The waterworks are owned by the city. Pop. 13,000.

CORTONA, kōr-to-nä, **Pietro di,** properly **PIETRO BERETTINI,** Italian painter and architect: b. Cortona, 1 Nov. 1596; d. Rome, 16 May 1669. Pope Urban VIII employed him to decorate a chapel in the church of Saint Bibiena and also to execute the frescoes of the grand salon of the Barberini Palace. Many churches of Rome were decorated by him; and at Florence he adorned the Pitti Palace for the Grand Duke Ferdinand II. His easel pictures, although of less value are in great estimation. As an architect he did some important work in church restoration.

CORTONA, Italy, city in the province of Arezzo, northwest of Lake Trasimeno, about 70 miles southeast of Florence. It is one of the oldest cities in Italy, and has, in a good state of preservation, a number of the old Roman buildings. It has well-preserved cyclopean walls, built more than 3,000 years ago, 8,500 feet in circumference, the ruins of the old Roman baths, a museum of Etruscan antiquities, including a remarkable candelabrum with 16 lights, assembled by the Etruscan Academy, founded in 1726; the cathedral of Santa Maria, containing paintings by Luca Signorelli, who was born here in 1441, as was Pietro Berettini in 1596. The ancient Cortona, called «Kyrtonia» by Polybius, was the strongest of the 12 cities of the Etruscan League. As a Roman colony it lost its importance, but in the 11th century again prospered. It sided mostly with the Ghibellines, came into the possession of the Casale family in the 14th century, in 1409 was given by the last of the house to Ladislaus of Naples, and by him in 1412 to Florence. Consult Della Cella, 'Cortona Antica' (Cortona 1900). Pop. 29,659.

CORUMBÁ, kō-room'bä, Brazil, town of the state of Matto Grosso. It is situated on the Paraguay River, near the Bolivian border, and has the largest trade of any place in the state. The receipts at its custom-house average annually $621,270. The principal products of Matto Grosso, maté, cattle, beef, hides, skins, rubber, etc., are shipped from this point. Here also is located the important arsenal of Ladario. Pop. 10,000.

CORUÑA, kō-roo'ña, **La,** Spain, seaport in the province of the same name in Galicia, on the northwest coast, on a peninsula at the entrance of the Bay of Coruña. It consists of an upper and a lower town, the former built on the eastern side of a small peninsula, and the latter on the isthmus connecting the peninsula with the mainland. The harbor, which is well protected, is deep, spacious, and safe, and many improvements have lately been made. Coruña is the centre of an extensive commerce, the exports comprising live stock, fruits, vegetables, wine, hams, sardines, leather, peat, etc., while the principal imports are sugar, hides, coal, oil and manufactured articles. There is also an important coastwise trade. The city has a large variety of manufactures, including cigars, linen goods, canvas, cordage, lumber, barrels, paper, etc. There is a large government tobacco factory. There is a lighthouse 92 feet high, called the Tower of Hercules, and supposed to be of Carthaginian construction and to have been remodeled in Trajan's time. Pop. 45,650. The chronicled history of Coruña dates from the Roman occupation. In the Middle Ages it was called Caronium. It was part of the emirate of Córdoba for some time, and suffered severely in the reconquest. The Portuguese captured the town in 1370. Here in 1386 John of Gaunt landed to urge the claims of his wife, Doña Constanza, to the Castilian crown, and in 1554 Philip II sailed from the port to marry Queen Mary of England. Coruña was the point of departure of the «Invincible Armada» in 1588, and in the following year it was taken by Drake and Norris and nearly destroyed. The harbor was the scene of English naval victories over the French in 1747 and 1805. Coruña is famous for the repulse, on 16 Jan. 1809, of the French under Marshal Soult, by Sir John Moore, who succeeded in withstanding the French attempt to stop the English embarkation, but lost his life in the battle. The engagement took place on the heights of Elviña. In 1823 the city fell into the hands of the French. In 1836 it was captured by the Carlists. The result of the Spanish-American War in 1898 was disastrous to Coruña's trade with Cuba and Porto Rico. The province of La Coruña contains another excellent harbor especially adapted for a naval station, namely Ferrol. It has many mineral springs which have been little exploited. The sea-fisheries are the prime industry. Pop. 631,000.

CORUNDUM, or **ADAMANTINE SPAR,** a native oxide of aluminum, Al_2O_3, crystallizing in the rhombohedral system, and also occurring massive. Its hardness is nine, and its specific gravity about four. It is adamantine or vitreous in lustre, and very variable in color. Three varieties are commonly recognized. Of these the first is known as sapphire, and includes those specimens that are used as gems (q.v.). The typical sapphire (q.v.) is blue, the red kind being known as "oriental ruby," the yellow as "oriental topaz," the green as "oriental emerald," and the purple or violet as "oriental amethyst." The colors of these gems are due to the presence of traces of certain metallic oxides. The second principal variety of the mineral is that which is known in the arts simply as "corundum," and is used as an abrasive (q.v.). It includes the less transparent varieties of blue, brown, black, gray or white colors. It is either crystallized or granular, or in masses showing distinct parting. The third variety, "emery," is not pure, but is an intimate mixture of corundum with magnetite or hematite. It has long been one of the most important abrasives (q.v.), but it is now being superseded by the greatly superior pure corundum. This usually occurs in crystalline rocks such as granite, gneiss, nepheline-syenite, granular limestone, also chlorite and mica-slate. Sapphire and ruby (qq.v.) are usually in alluvial deposits and in the beds of rivers. The Canadian corundum deposits, discovered a few years ago, are the largest and most important known. Corundum is also found in many other localities, notably in North Carolina, Georgia, Montana and India. The commercially valuable deposits in the United States occur chiefly as segregations in ultra basic igneous rock (dunite) in North Carolina and Georgia, while the Canadian deposits occur as pegmatite dikes (q.v.).

CORVALLIS, Ore., town and county-seat of Benton County, situated in the western part of the State on the Willamette River and on the Southern Pacific and the Oregon Central and Eastern railroads. It also has steamboat service for two-thirds of the year, and as the centre of an agricultural district has considerable export trade, particularly in wheat. It has sawmills, planing-mills, a carriage factory, flour-mills, woolen mills, brick and tile factories, and other manufacturing industries. Dairying, stock raising and the raising of fruit and berries are important occupations. It is the seat of the State Agricultural College. Pop. 5,000.

CORVÉE, kôr-vā (Fr., from Lat. *cura viæ*, "care of the road"), the obligation of the inhabitants of a certain district to do certain labor for the feudal lord or the sovereign gratis or for pay. *Corvée* originally meant compulsory labor on roads, bridges, etc., but it is applied also to other feudal services. In some parts of Germany they still exist. In Prussia they were abolished under Hardenberg's administration. In France the first revolution extirpated this relic of the feudal times.

CORVETTE, a term applied to a flush-deck vessel, ship- or bark-rigged, having only one tier of guns, usually not more than 26, either on the upper or main deck, ranking between a brig and a frigate. The term is no longer used.

CORVEY, kŏr-vā', or **KORVEI**, a formerly renowned Benedictine abbey near Höxter in the Prussian province of Westphalia, founded in 816; an early centre of German civilization. Wittekind, the historiographer of the convent, Bruno, known afterward as Pope Gregory IV, and many other learned men were educated here. To its library belonged the only manuscripts of the first six books of the 'Annals of Tacitus' discovered here in 1514. In 1793 it was made a bishopric by Pius VI. Its territory then embraced about 22 square miles, with 10,000 inhabitants. In the first quarter of the 19th century Corvey passed in quick succession into the possession of the House of Orange, of Westphalia, of Prussia, and of the Duke of Ratibor, to whom it now belongs. The church of the abbey or castle of Corvey is built in the Gothic style, magnificently adorned in the interior and contains a number of monuments of successive dynasties and has a rich and extensive library; but the ancient collection of the Benedictines is no longer in existence. Certain brief 'Annales Corbeienses' from 648 to 1148 are printed in the 'Monumenta Germaniæ Historica.' Consult Wigand, 'Geschichte der Abtei Korvey' (Höxter 1819).

CORVIDÆ, kôr'vĭ-dē, a family of passerine birds containing the crows and their allies, closely related to the blackbirds (*Icteridæ*), starlings (*Sturnidæ*), birds of paradise (*Paradiseidæ*) and larks (*Alaudidæ*). The bill is generally strong, more or less compressed; the upper mandible to a certain extent curved, the tip notched; the nostrils are covered with stiff bristle-like feathers pointing forward; there are 12 retrices in the tail and 10 primary wing feathers. Most ornithologists now recognize three sub-family divisions, the *Fregilinæ* or choughs, the *Garrulinæ*, or jays and magpies, and the *Corvinæ*, or crows, of which the last two are represented in North America by numerous species. About 150 species, distributed in upward of 35 genera, are found in all parts of the world except a few islands of the south Pacific region. *Callæas* and its allies of the New Zealand islands are sometimes included as a fourth sub-family.

CORVINUS, kôr-vī'nŭs, **Matthias**. See MATTHIAS I. CORVINUS.

CORVO, the westernmost island of the Azores (q.v.) or Western Islands and the nearest European point to America. First mentioned in 'The Book of the Spanish Friar' written about 1350, of which a translation by Sir Clement Markham was issued by the Hakluyt Society in 1912. It appears on Atlante Mediceo map attributed to 1351. The name signifies Sea Crow. The island is an extinct volcanic crater uplifted about 300 feet above the sea. It is about six miles long and three miles wide with population of about 950. Consult Babcock, W. H., 'Geographical Review' (Vol. V, pp. 66–72, 18 Jan. 1918).

CORVUS, **Marcus Valerius**, Roman general: b. about 371 B.C.; d. about 270 B.C. He was twice a dictator, six times a consul and occupied the curule chair 21 times. He distinguished himself in the first Samnite war, and, according to the legends, was assisted in killing a gigantic Gaul in single combat by a raven, which picked out the eyes of his antagonist.

CORWIN, **Edward Tanjore**, American clergyman: b. New York, 12 July 1834; d. North Branch, N. J., 22 June 1914. He was graduated at the College of the City of New York (1853), and at the New Brunswick, N. J., Theological

Seminary of the Reformed Dutch Church. He held New Jersey pastorates at Paramus 1857–63, and Millstone 1863–88, when he became rector of Hertzog Hall, New Brunswick. In 1897–98 he was in Holland as special agent of the Synod of the Reformed Church collecting from the Archives of the Classis of Amsterdam and elsewhere the so-called "Amsterdam Correspondence" of the Colonial American Dutch churches with the Classis of Amsterdam. From 1899 to 1907 he lived in New Brunswick, N. J., and at North Branch, N. J., from 1907 until his death. He has published 'Manual and Record of the Church of Paramus' (1858); 'Manual of the Reformed Protestant Dutch Church in North America' (1859); 'The Millstone Centennial' (1866); 'The Corwin Genealogy in the United States' (1872); 'Ecclesiastical Records of New York State' (1905) and many articles and addresses published in papers, pamphlets and magazines on historical and biblical subjects.

CORWIN, Thomas, American statesman and orator: b. Bourbon County, Ky., 29 July 1794; d. Washington, D. C., 18 Dec. 1865. He was admitted to the bar at Lebanon, Ohio, in 1817, and elected to the Ohio legislature in 1821. He became a member of Congress in 1831; was governor of Ohio 1840–42; United States senator 1845–50; Secretary of the Treasury 1850–53; member of Congress 1859–61, and United States Minister to Mexico 1861–64. He was an eloquent orator and one of his most famous speeches was delivered in the Senate 11 Feb. 1847, in opposition to the Mexican War. Consult Russel, 'Thomas Corwin' (Cincinnati 1882), and Morrow, J., 'Life and Speeches of Thomas Corwin' (Cincinnati 1896).

CORY, Charles Barney, American naturalist: b. Boston, Mass., 31 Jan. 1857. He is a director in many important corporations, but best and most widely known as an expert vertebrate zoölogist. He is an honorary curator of the Field Columbian Museum, Chicago, and a Fellow of the Linnæan and Zoölogical societies of London, England. His published works include 'A Naturalist in the Magdalen Islands' (1878); 'Birds of the Bahama Islands' (1880); 'Southern Rambles: Florida' (1881); 'The Beautiful and Curious Birds of the World' (1883); 'Birds of Haiti and San Domingo' (1884–86); 'Birds of Eastern North America'; 'How to Know the Ducks, Geese, and Swans of North America'; 'How to Know the Shore Birds of North America'; 'The Birds of the West Indies'; 'Key to the Water Birds of Florida'; 'Key to the Birds of Eastern North America'; 'Hunting and Fishing in Florida'; 'Montezuma's Castle, and other Weird Tales' (1899); 'Dr. Wandermann'; 'The Birds of Illinois and Wisconsin' (1909); 'Mammals of Illinois and Wisconsin' (1912); 'Description of Twenty-eight New Species and Subspecies of Neotropical Birds' (1913).

CORYAT, Thomas, English traveler: b. Odcombe, Somerset, 1577; d. Surat, India, December 1617. He published in 1611 some of his traveling experiences, 'Coryat's Crudities,' etc., a curious book, to which quizzical verses in various ancient and modern languages, written by Ben Jonson, Donne and other authors, are appended. The latter were afterward published separately under the title of 'Odcombian Banquet,' with an advertisement reflecting satirically upon Coryat, who was a butt of the wits with whom he associated in London. In a second volume, however, entitled 'Cramb, or Colwort Twice Sodden,' published the same year, he protested that the verses were appended to the former without his consent. In his first journey, which occupied five months in 1608, he traveled nearly 2,000 miles in Europe, about one-half of which distance he walked. He departed on his second journey in 1612, explored the Levant, resided for a time at Constantinople, examined the vestiges of Troy, visited as many of the sites of the seven churches of Asia Minor as he could discover, and reached India with the intention of proceeding thence through China, the plains of Tartary and Ethiopia, and of "casting his eyes upon many other places."

CORYBANTES, beings mentioned in Greek mythology which were said to have sprung from Corybas, son of Cybele and Iasion, who appointed them to perform religious service for his mother, the goddess Cybele, in Crete and Phrygia. They engaged in wild religious dances to the accompaniment of the music of flutes, cymbals, etc. There were also Corybantes who were regarded as a class of deities resembling the Cabeiri, and of whom little is known. According to ancient traditions, they were descendants of Hephæstus (Vulcan). The name is sometimes given to the priests of Cybele, as it was said they imitated the dance of the Corybantes. Consult Frazer, 'Adonis, Attis, Osiris' (London 1907, in part IV of 'The Golden Bough').

CORYDALIS, or ALDER-FLY, one of our largest insects, whose net-veined wings expand nearly six inches. It is a member of the neuropterous family *Sialididæ,* and is named *Corydalis cornutus* in allusion to the enormously long horn-like mandibles of the male, used as claspers in the act of pairing, those of the female being large, but short, broad and toothed. The larva is called in the northern States dobson or hellgramite, and among the Mississippi fishermen it is known as crawler; it is much esteemed as bait. The larva lives for nearly three years under stones in brooks; is nearly three inches long, with six legs and big jaws, and along each side of the hind-body is a series of long filamentary appendages, at the base of which are short bushy or spongy gills. It breathes by the spiracle during its later larval life, when it lives out of the water. It transforms into a chrysalis in the earth on the banks of brooks. The female lays from 2,000 to 3,000 eggs in a mass. Though very ferocious in appearance, the insect, which sometimes alights on one's dress, is entirely harmless. Consult Davis, 'Aquatic Insects in New York State' (Albany 1903); Howard, 'The Insect Book' (New York 1901); Kellog, 'American Insects' (New York 1908); Miall, 'The Natural History of Aquatic Insects' (London 1895).

CORYDON, Ind., town and county-seat of Harrison County, 25 miles southwest of Louisville, on the Louisville, New Albany and Corydon Railroad, and on Indian Creek. It contains a sulphur spring which attracts a great number of vacationists and valetudinarians. From 1813 to 1816 Corydon was the capital of the Territory, and of the State from 1816 to 1825. The old capitol building still stands. Morgan's raiders attacked a small Federal force here in 1863. Pop. 1,668.

CORYDON, Iowa, town and county-seat of Wayne County, situated in the southern part of the State, 81 miles south of Des Moines, on the Keokuk and Western and the Chicago, Rock Island and Pacific railroads. Corydon is essentially an agricultural town and exports a large amount of timothy seed. The electric-light plant, sewer and waterworks are under municipal ownership and control. Pop. 1,703.

CORYMB, in botany, a form of indefinite inflorescence, in which the flower-stalks, though springing from different parts of the main axis, have their lengths such that their tops form a flat or nearly flat surface. Examples are meadow-sweet, hawthorn, candytuf, etc.

CORYMBUS, in ancient sculpture, the wreath of ivy-leaves, berries or garlands with which vases were encircled. The term is also applied to that style of dressing the hair among the Grecian women, in which it was tied in a knot on the top of the head. The Venus de' Medici represents the simplest form of this head dress.

CORYPHÆNA, kôr-ĭ-fē'ną, a genus of fishes of the family *Coryphænidæ,* related to the mackerels. The body is elongated, compressed and covered with small scales, and the dorsal fin extends the whole length of the back, or nearly so. The dolphin of the ancients is the *C. hippuris.* All the species, natives of the seas of warm climates, are very rapid in their motions, and very voracious. They are of brilliant colors and are objects of admiration to every voyager.

CORYPHÆUS, kôr-ĭ-fē'ŭs, the leader of the chorus in the ancient dramas. His functions, however, were often as wide as those of our stage-manager, conductor and ballet-master. The name is now applied to the leaders of the different parts in operatic choruses, or the principal dancers in the *corps de ballet.* By extension it is also applied to those eminent in the arts or sciences.

CORYPHODON, kō-rĭf'ō-dŏn, a fossil ungulate of the extinct order *Amblypoda* (q.v.), found in the Lower Eocene sediments of Europe and America. The feet were short and post-like, somewhat like those of elephants, while the head resembled rather that of a hippopotamus with large flaring front teeth covered by a broad fleshy muzzle, and the skeleton had many archaic and peculiar characters. The coryphodon was the largest land animal of its time, intermediate in size between the tapir and rhinoceros. A mounted skeleton has been erected in the American Museum of Natural History, New York.

CORYZA (Gr. *κορυζα,* "catarrh"), a cold in the head. See Cold.

COS, or **KOS,** island belonging to Turkey; situated off the southwest coast of Asia Minor, in the Ægean Sea; length about 25 miles; area about 110 square miles. It is noted as the birthplace of Hippocrates and Ptolemy II, surnamed Philadelphus, and it claims the honor of being the birthplace of the Greek artist, Apelles. The surface rises partly into rugged hills, but a considerable portion is fertile and well cultivated, yielding grapes, oranges, olives, pomegranates, etc. The modern town of Cos is well built, and contains a large quadrangular fortress erected by the Knights of Rhodes in the 14th century. The harbor is now so filled up that only small vessels can enter. In the Iliad we find mention of this island as one of the allies of the Greeks. Later it was annexed to the Dorian Hexapolis. It changed hands many times until its capture by the Turks in 1523. In 1912 it was captured by the Italians but restored in the same year to the Turks with the other Ægean Islands. During the Balkan War, a movement was pushed for the union of Cos with the Greek kingdom. By the Treaty of London 30 May 1913, the final disposition of the Ægean Islands was left to the Powers; the Italian occupation of Cos continuing for the time being. In Cos was manufactured a fine, semi-transparent kind of silk, much valued by the ancients. Pop. about 10,000.

COSALITE, an important bismuth ore containing 42 per cent of that metal with formula $Pb_2Bi_2S_5$. Occurs in Colorado, Utah and Washington.

COSCINOMANCY, or **COSKINOMANCY,** a kind of divination effected by means of a sieve, which was either suspended or fixed on the point of a pair of shears. The diviner then uttered a certain formula, and repeated the names of any persons suspected of a crime. If the sieve moved at the mention of any name, that person was considered guilty.

COSEGUINA, kō-sē-gwē'nä, a volcano in the western part of Nicaragua on a peninsula south of the Gulf of Fonseca. The mountain is cone-shaped and 4,000 feet high. It is remarkable on account of the eruption of 1835, beginning 20 January and lasting three days. The country within 100 miles was darkened by the cloud of ashes, and ashes were carried as far as Jamaica and Mexico. The volcano is now quiescent.

COSEL, or **KOSEL,** Germany, capital of a district of Silesia, Prussia, on the Oder, at the confluence of the Klodnitz, 25 miles southeast of Oppeln. It is a garrison town, has a castle, and was formerly surrounded by walls, the site of which has been converted into boulevards. A fine monument commemorates the unsuccessful siege by the French in 1807. The town manufactures celluloid, lumber, flour, malt, beer, bricks and refined petroleum. It was the capital of a former duchy in the 14th century. Pop. 7,832.

COSELEY, kōz'lĭ, England, town in Staffordshire, within the parliamentary boundaries of the borough of Wolverhampton, eight miles northwest of Birmingham. There are iron foundries, nail, hook, chain and screw works, stove-grate manufactories, cement works, malting establishments and brick-fields. There are extensive iron and coal mines in the district. Pop. 22,834.

COSENZA, kō-sĕnt'sä (anciently, Cosentia), Italy, city of the southern part, capital of the province of Cosenza (Calabria Citeriore); situated on seven small hills, at the foot of the Apennines, where the Busento joins the Crati, 150 miles southeast of Naples. The metropolitan is the only church within the walls; but there are three parish churches in the suburbs. The cathedral, of the 13th century which has been restored, contains the tombs of Louis III of Anjou and Isabella, consort of Philip III of France. In the public gardens are a figure of Liberty by Giuseppe Pacchioni, erected to those who took part in the Calabrian rebellion of 1844, and busts of Garibaldi, Cavour and Mazzini. It contains one technical school, two academies of science and fine arts and one college. The environs are beautiful, populous and well cultivated, producing abundance of corn, fruit, oil, wine and silk. It manufactures faïence, iron and steel ware. This town was anciently the capital of the Brutii, and a place of consequence in the Second Punic War. It is supposedly the burial place of Alaric, king of the Visigoths. Cosenza has frequently suffered from earthquakes, particularly in the years 1638, 1783, 1854 and 1870. Pop. about 20,000.

COSHOCTON, kō-shŏk'tŏn, Ohio, city and county-seat of Coshocton County, situated on the Muskingum River, on the Ohio Canal and on the Pennsylvania, the Pittsburgh, Chicago, Cincinnati and Saint Louis and the Wheeling and Lake Erie railroads, 69 miles northeast of Columbus. The city has four large advertising and sign manufactories employing about 1,000 hands, machine-shops, pipe works, automobile, carriage, furniture and glass factories, potteries, flour-mills, iron and steel works and a paper-mill. There is an abundant supply of gas, iron and coal nearby. There are three banks, with a combined capital of $225,000. There are four public schools, and an excellent public library, and 10 church edifices. Settled in 1811, Coshocton became a borough in 1848, and a city in 1902. Municipal affairs are administered by a mayor and council of seven members, elected biennially. The city owns and operates its waterworks. Here after a long struggle, Colonel Boquet concluded a treaty with the Delaware Indians in 1765. Pop. 10,000.

COSMATI FAMILY, a family of architects and sculptors who flourished in Rome from the last half of the 12th century to the beginning of the 14th, who are known principally through their inscriptions. The more prominent members of the family were Lorenzo (2d half of 12th century), Cosma (about 1210–35), Luca (1231–35), Jacopo (1231–93), Giovanni (1296 and 1303), Adeodato (1294). They won their fame by their decorative architectural work, known as Cosmati or Roman work, distinguished by the use of mosaic and colored marbles. Among their best works are the entrance to the cathedral of Civita Castellana, the cloisters of the Lateran and the abbey-house of Saint Pool; the door of Saint Saba; choir-screen in Saint Lorenzo fuori le Mura; tombs in Santa Maria sopra Minerva, in Santa Maria Maggiore and in Santa Balbina; the chapel of the Sancta Sanctorum in the Lateran; the marble altar at Saint Cesareo and the magnificent cloisters at Saint Paolo fuori le Mura. A large number of unsigned works by members and pupils of the same family are to be found in Rome. They are mainly minor pieces: baldacchini, candlesticks, tombs, etc., all remarkable for their exquisite sculpture and beautifully decorative mosaics. Gothic lines predominate in their style, but the defects of the execution of detail were offset by the beauty of their materials. Consult Boito, 'Architettura del medio evo' (Milan 1880); Müntz, E., 'Etudes sur l'histoire des arts à Rome pendant le moyen âge' (Rome 1881); Frothingham, 'Monuments of Christian Rome' (New York 1908); Clausse, G., 'Les Monuments du Christianisme au moyen âge' (Vol. II, Chap. XXII, Paris 1893).

COSMETICS (Gr. *κοσμητικός*, from *κοσμεῖν*, "to decorate"), means for preserving or increasing the beauty of the human body. Such means are used by the most savage as well as the most civilized nations. Cosmetics consist of perfumed waters, oils, salves and powders and are applied to various parts of the body, the face, hair, teeth and hands. Their purposes are to add or change color, to remove blemishes, whiten teeth, perfume the breath or deodorize any offensive natural odors and stimulate growth of hair. Most of the powder preparations for the skin are injurious for they often contain poisonous substances and clog the pores of the skin, thus interfering with its natural functions. Excessive use of creams serves to enlarge the pores of the skin and make it wrinkle early. Manicuring and hair-dressing belong to the cosmetic art. Cosmetic surgery is practised to remove positive disfigurements, such as birthmarks, moles, harelip, superfluous hairs, etc. Consult Peisse, G. W. S., 'Des odeurs, des parfums, et des cosmétiques' (Paris 1856; Eng. trans., Philadelphia 1857); Hirzel, 'Toillettenchemie' (Leipzig 1874); Koller, Thomas, 'Cosmetics: a Handbook of the Manufacture, Employment and Testing of All Cosmetic Materials and Specialties' (trans. from the German by Chas. Salter, London 1911).

COSMIC DUST. See Dust.

COSMICAL GEOLOGY, or COSMOGONY, that branch of geology that treats of the origin of the earth and its relations to the rest of the solar system and to the universe in general. See Cosmogony, and the section on *Cosmogony* in the article on Geology.

COSMOGONY. From the Greek *κοσμογόνια*, meaning creation of the world. It is authenticated by Philolaüs and Plutarch that Pythagoras himself used the word *κόσμος*, to denote the order of the world, to which is added *γενία*, origin; the word *κυσμογόνια* being first used as the title of a work by Parmenides (born 544 B.C.) who was the revered teacher of Plato. The term is now used to designate theories in regard to the origin and development of the solar and stellar systems, and the universe in general.

From the earliest ages the subject of cosmogony has been considered so important for human thought that, by way of poetry and allegory, it usually enters into the religious teachings of the different peoples, as the Greeks, the Hebrews, Egyptians, Persians and Hindus; in fact, it is almost as prevalent among primitive races as mythology and folklore, with which, in early literature, it is usually connected. The cosmogony of the Book of Genesis may be considered the most advanced development of Hebrew thought, as modified by the learning of the Chaldeans and Egyptians.

Among the Greeks cosmogony was first treated by the poets in a very primitive manner, and afterward developed into more of a science by the natural philosophers,— such as Thales, Anaximenes, Anaximander, Xenophanes, Parmenides, Empedocles, Anaxagoras, Plato and Aristotle. The highly artistic doctrine set forth in Plato's 'Timaeus probably represents the highest development of Greek thought on this subject, though from a modern point of view the theories of the school of Atomists, founded by Leucippus and Democritus, are the most interesting because they predicted the development of vortices such as we find among the spiral or whirlpool nebulæ, disclosed by modern astronomical observations. Thus the Greeks were the first to attempt to explain the origin and motions of the heavenly bodies, and how these motions originated; and we shall therefore pass over the other early writings, and notice only the cosmogony of the Greek Atomists, since this alone approaches the requirements of modern astronomy.

In his 'Outlines of the History of Greek Philosophy,' the late Prof. Edouard Zeller, of the University of Berlin, summarizes the views of the Atomistic School thus: "On account of their weight, all the atoms from eternity move downward in infinite space; but according to the Atomists, the larger and therefore heavier atoms fall more quickly than the smaller and lighter, and strike against them; thus the smaller are impelled upwards, and from the collision of these two motions, from the concussion and rebound of the atoms, a whirling movement is produced. In consequence of this, on the one hand the homogeneous atoms are brought together; on the other, through the entanglement of variously shaped atoms, complexes of atoms, or worlds, segregated and eternally sundered, are formed. As motion has no beginning, and the mass of atoms and of empty space has no limits, there must always have been innumerable multitudes of such worlds existing under the most various conditions, and having the most various forms. Of these innumerable worlds our world is one." (Cf. Zeller's 'Outlines,' p. 79).

The theory of the Atomists here set forth is erroneous in ascribing the collisions to the more rapid fall of the heavier atoms; yet this accorded with the teachings of physics coming down from the time of Aristotle. This fallacious doctrine was first overthrown by Galileo's discovery of the true law of accelerative force, under which heavy and light bodies fall with the same velocity. Leaving out of account this defect in physical theory, the Greek explanation of the origin of vortices is clear and is the first attempt of scientific character at explaining the motions of rotation and revolution noticed among the heavenly bodies.

DEVELOPMENT OF THE SOLAR SYSTEM.

Laplace's Nebular Hypothesis.— Not long after Galileo's invention of the telescope in 1610, and its application to the heavens by his immediate successors, it was found that the Sun and Mars were rotating on their axes, that Jupiter had equatorial belts and a system of four satellites whirling about that great planet, and that the planet Saturn was surrounded by the system of rings. The rotation of the earth on its axis had been taught by Aristarchus of Samos (who flourished about 270 B.C.), and was fully established by the great work of Copernicus, published in 1543. Similar rotatory motion of the other planets was now proved by the telescopic discoveries of Galileo. So many motions of rotation and of revolution naturally increased the complexity of the system of the world; and when philosophers began to cast about for the cause of these things, Kepler suspected that the rotation of the sun had some influence on the orbital motions of the planets. In fact, he thought that subtle spirits emanating from the surface of the sun had impressed themselves on the motions of the planets, so that they were carried around tangentially in the same direction. This is the earliest hint of the theory afterward developed by Kant and Laplace under the name of the "nebular hypothesis." The term nebulæ designates patches of luminous matter occurring in the sky and differing from the stars in that they present large surfaces of varying brilliancy instead of small definite points of light.

We shall not go into the details of the early history of the nebular hypothesis, beyond remarking that in various forms it was imperfectly outlined by Emanuel Swedenborg (1688–1772); more satisfactorily treated by Thomas Wright (1711–86), of Durham, England; Immanuel Kant (1724–1804), of Königsberg, Prussia; and finally put on a much more scientific basis by the telescopic explorations of Sir William Herschel (1738–1822), and the mathematical genius and dynamical judgment of the great French astronomer Laplace (1749–1827). Swedenborg's Cosmogony was the earliest, 1734. Wright's work dates from 1750; Kant's from 1755, and he acknowledges his indebtedness to Wright; Herschel's from 1791, after years of mature observations on nebulæ; while Laplace's theory of 1796 was the outcome of a quarter of a century of profound study of the mechanics of the solar system.

On account of the great mathematical prestige of the illustrious author of the 'Mécanique Céleste,' it was natural that Laplace's theory should be the one most generally accepted by men of science. According to this view the matter now constituting the sun and planets was originally diffused into an oblate planetary nebula. Sir William Herschel had recently observed and catalogued great numbers of planetary nebulæ throughout the sidereal universe. To account for the motions of the planets close to one fundamental plane and in nearly circular orbits, Laplace conceived that the primordial nebula had been endowed with a rapid motion of rotation; and when thus rendered very oblate by the effects of centrifugal force, had detached or thrown off successive rings of vapor from the equatorial portion of the mass, which was supposed to be at high temperature and kept in equilibrium under the pressure and attraction of its parts. These rings of vapor were imagined to have condensed into the planets, which therefore revolve in nearly circular orbits. The satellites were explained in the same way, by the condensation of rings of vapor imagined to have been thrown off from the several planets, as they cooled and contracted and accelerated correspondingly their velocity of axial rotation.

In very brief outline this is the celebrated nebular hypothesis of Laplace, which has exerted so great an influence on philosophic thought for more than 100 years. In some form or other it enters into all the books on astronomy, as giving the best available explanation of the origin of the solar system; but it will be shown below that the "hypothesis of detachment" postulated by Laplace is entirely erroneous, and will have to be supplanted by a very different theory.

Before considering certain grave errors in the theory of Laplace, it may be remarked that Sir Isaac Newton had given much thought to the motions of the planets and satellites, especially remarking on the beautiful, orderly and symmetrical arrangement of the solar system; but he was unable to explain the orderly movements of these bodies, except by supposing that they had been set revolving in their orbits by the immediate hand of the Deity. Laplace's theory had the great advantage, from a scientific point of view, that for a teleological it substituted a mechanical explanation of the motions of the planets, in harmony with Herschel's observations of the nebulæ. Notwithstanding the fundamental error involved in the theory of detachment, the nebular hypothesis as a whole has guided our thought pretty much up to the present time. Yet the difficulties encountered by the theory of Laplace have steadily increased, and of late years became so overwhelming that the old conceptions of rings detached by rotation have had to be entirely abandoned.

As the solar system was held to have resulted from the condensation of a globular or planetary nebula, the subject of the nebular hypothesis is closely connected historically with the gravitational theory of the sun's heat. For a long time it was assumed by investigators that the sun was originally expanded into a nebula filling the planetary orbits, and rotating in equilibrium under the hydrostatic pressure and attraction of its parts. In order to keep this figure of equilibrium the temperature would have had to be enormous, and such a temperature really could not be maintained, owing to the extreme tenuity of the hypothetical nebula. For when the nebula extended to Neptune's orbit the average density would be 260,000,000 times less than that of atmospheric air at sea-level; and such a tenuous medium could exert no hydrostatic pressure from the centre outwards, for detaching the planets by increase of centrifugal force under accelerating rotation, as imagined by Laplace. This criticism against Laplace's theory was urged by Kirkwood and Peirce over 40 years ago, and such an objection is valid and convincing; but as there was no other suggested way in which the planetary bodies could be started revolving in their nearly circular orbits, it was not doubted that such detachment had occurred.

In 1861 the French physicist, Babinet, pointed out a fatal weakness of Laplace's theory which is now usually known as "Babinet's criterion." It is based on the mechanical principle of the *conservation of areas,* so much applied by Laplace and other investigators since Newton's proof of the constancy of the areas described by any system of particles contracting and accelerating its rotation under central forces. It readily follows from this principle that whatever changes may take place in the system, its whole quantity of rotation must remain constant; by this is meant that if the mass of each particle of the system is multiplied by the square of its distance from the central axis of rotation and also by its angular velocity, and if all the products thus obtained for the particles are added together, the sum will remain forever constant. Now it is possible to obtain a quite approximate value for this sum derived from the actual system as we see it today, for the masses of its various parts, their distances from the central axis, and their observed angular velocities of motion are all known. Having found this quantity, we may proceed to test the Laplacian hypothesis in a great variety of ways, many of which lead to necessary assumptions which are not only quite incredible, but in some cases impossible.

For example, we may readily determine the period of rotation of the solar nebula when it extended outward to each of the planets successively; by so doing we obtain the results given in the following table:

Table showing the application of Babinet's criterion to the planets and satellites, when the Sun and planets are expanded to fill the orbits of the bodies revolving around them

Planet	Observed period of planet	Time of the sun's rotation calculated by Babinet's criterion
Mercury.............	0.24085 yrs.	479 yrs.
Venus...............	0.61237 "	1673 "
The earth...........	1.00000 "	3192 "
Mars................	1.88085 "	7424 "
Ceres...............	4.60345 "	24487 "
Jupiter.............	11.86 "	86560 "
Saturn..............	29.46 "	290962 "
Uranus..............	84.02 "	1176765 "
Neptune.............	164.78 "	2888533 "

It will at once be noticed how greatly the numbers of the third column exceed those of the second. Should we suppose that Neptune, for example, could have been formed in this way it would be necessary to assume that the period of its ring was diminished from nearly 3,000,000 to but 165 years, notwithstanding that we can recognize no imaginable cause which could produce this diminution.

Babinet's criterion furnishes us with several other tests, some of them even more conclusive than this, of the impossibility of the material from which the planets are formed having been abandoned by the original nebula in the form of rings. If, overlooking these, we admit that a ring were abandoned, it can be shown that so far from the material of the ring ultimately being gathered into a single mass, the tidal action of the central portion of the cloud would separate and scatter it, so that a ring would not even start to gather into a planet. But further than this, it can be shown that even if the greater part of the ring could be gathered into a single planet, it would be quite impossible for this mass to gather to itself the remaining parts of the ring.

We have thus considered the Laplacian hypothesis somewhat fully because of its historical importance and because for so long a time it was regarded as furnishing a very probable outline of the successive steps by which our solar system developed from the original nebula into its present form. It should not be overlooked, however, that much less importance was ascribed to this theory by its originator than by his followers, who, attracted by its completeness and seeming simplicity, raised it almost to the position of a proved and fundamental doctrine.

Laplace himself, a master of rigorous mathematical deduction, could not have been deceived as to the weakness of its foundation. Indeed, he put it forth as a speculation merely, which (in his own words) was advanced «with that distrust which everything ought to inspire that is not a result of observation or of calculation.»

Modern Hypotheses.— In all modern hypotheses as to the development of the solar system it is recognized at the outset that the original nebula must have been of a very heterogeneous structure. Its material in the beginning may have been arranged in a more or less spiral form, the curved branches extending outward from a common centre, and thus resembling the thousands of spiral nebulæ seen in the sky, but whether this be so or not, it is assumed that there existed here and there throughout the cloud many smaller clouds, or knots, of the nebulous material, denser than the nebula immediately surrounding them. The original nebula is supposed to have been a great cloud, composed of meteorites or meteoric particles, cosmic dust, gases, and probably some matter in a radiant condition; in short, to have had exactly the same constitution as we believe is possessed by the same class of nebulæ which we see in the sky. The whole meteoric cloud thus constitutes a *Resisting Medium,* through which its separate particles and the denser clouds within it must necessarily move. The question concerning what such a heterogeneous cloud will develop into as it shrinks together under its own gravitation has recently received a great deal of attention from certain astronomers. The result of a most thorough mathematical analysis is to indicate that the outcome must be a solar system more or less closely resembling our own. The analysis has been applied, not only to a broad outline of the development of the system as a whole, but also to the separate planet-satellite systems, the rings of Saturn, the retrograde or apparently too rapid motions of certain satellites, and even to the reason for the present situations and rotations of the planets, for all of which it seems to account in a satisfactory manner. The principal contributions to this subject will be found by the reader as follows: Thomas C. Chamberlain and F. R. Moulton, 'Year-book No. 3' of the Carnegie Institution of Washington; *The Astrophysical Journal* (Vol. XXII, 1905); See, T. J. J., 'Evolution of the Stellar System' (Vol. II, Lynn, Mass.), and numerous papers in the *Astronomische Nachrichten* and the *Journal of the American Philosophical Society.* By the former authors, the new theory is called the Planetesimal Theory, the separate particles of the original nebula being called Planetesimals; by the latter it is named the Capture Theory, attention being thus drawn to the fact that the lesser bodies of the completed system, instead of having originally formed a part of the central body and having afterward separated from it, were actually drawn nearer to this body from without, and so in a sense «captured.» In the present article we can only indicate in briefest outline the successive steps of the development which the original nebula will undergo.

In the first place, any separate particle or any cloud of particles in the original nebula will (unless there is no motion at all) find itself moving, not in empty space, but in a resisting medium. It can readily be shown by mathematics that the certain effect of this resistance will be to cause the particle to fall continually nearer the centre of the whole, gathering up and adding to itself much of the material through which it moves, until finally, if the resisting medium extends quite to the centre, the particle or cloud will fall onto the central mass and become a part of it. Thus the central mass will continually grow by the absorption of a great part of the cloud around it, nor will this action cease until the resisting material has been quite completely swept away.

There will thus come a time when the nebula has been replaced by a dense, central, nebulous mass, around which a greater or less number of smaller clouds or swarms are revolving in a region which still contains a considerable amount of resisting material. And these smaller clouds will all move around the central cloud in the same direction, which will be that of the general rotation of the original nebula as a whole, for it can be shown that such bodies as began to move in a contrary direction, when the resistance was high, must have been speedily brought down upon the central mass. Investigation shows that a second effect of a resisting medium must be to diminish the eccentricity (or increase the roundness), of the paths in which the bodies are moving. Thus the lesser clouds must steadily drop nearer the centre, their orbits at the same time becoming continually rounder, until they attain a region which has been swept clear, or nearly so, of resisting material. The contraction of each smaller cloud into a planet with a possible system of satellites is explained by an exactly similar course of reasoning.

It is thus from the lesser clouds, or portions of greater condensation in the original nebula, that the planets have originated, and each has acquired a greater or less size according as its cloud in passing through the resisting medium has gathered up and added to itself a greater or less amount of this material. It can be shown that in whatever manner a small cloud may have been originally rotating, the effect of its collisions with the scattered particles among which it moves will be to give it a forward rotation; that is, one in the same direction as its own motion around the central mass. And the more collisions it has sustained, and hence the larger it has grown, the more rapid should we expect its rotation to become. This is in accordance with what is observed in the solar system, where Jupiter and Saturn rotate in less than half the time of the small planets. A similar investigation shows that all satellites formed near the smaller clouds while the system was still young should have small and rounded orbits, and their motion should be direct, but that there may also be more distant satellites moving in a retrograde direction in orbits which are highly eccentric.

The Origin of Spiral Nebulas.— A theory has been advanced, and quite fully developed from a mathematical standpoint, to account for the existence of spiral nebulæ in general, and in particular for that of the original solar nebula, which is thus supposed to have had a spiral form. It is supposed that these nebulæ were caused by the close approach, or even by the actual collision, of two suns, for it can be shown that if such a close approach occurs the enormous gravitational attraction may tear one or both of these bodies apart into a roughly two-branched cloud, whose arms under the pull of the passing body may be drawn into curves strikingly similar to the outlines of certain of the well-known spiral nebulæ. But there are grave and apparently insuperable objections to the hypothesis. In the first place, where the stars are most thickly gathered together (that is, in the direction of the Milky Way), almost none of these nebulæ are found. It is here that the so-called New Stars predominate, but spiral nebulæ are almost wholly confined to outside regions where the stars are few and the probability of a collision, or even of a near approach, of two suns is almost infinitely small. Moreover it is certain that the spiral nebulæ seen in the sky are of enormous size. Though the spectroscope shows that they are moving through space with speeds which range from 200 to 700 miles a second, they are so distant that even these great nations have not displaced them appreciably on the sky (except possibly in one instance), even when measures which are separated by many years are compared. In many cases they must have thousands of times the extent of our solar system. Indeed, some astronomers believe that these nebulæ, so far from being true nebulæ, are, in reality, clusters of almost infinitely distant stars.

It is not indeed unlikely that any rotating nebula would as it contracted assume a more or less spiral form, and this may with some probability be assumed to have been the form of the prototype of the solar system. But the assumption of this, or of any other definite form, for the original nebula in no way affects the modern theory of the development of the solar system which has just been discussed.

The Earth-Moon System.— In the general process of evolution above described there are several local and minor modifications which must be made the subject of special inquiry. The system of our earth and moon, for example, is wholly unlike that of any of the other planet-satellite systems, for while in these the moons are all minute bodies in comparison with the planet, our own moon is comparable in size with the earth and is indeed so large that it is perhaps better to regard these bodies as forming a sort of double-earth system than a planet attended by a satellite. It is uncertain whether the earth and moon originally formed a single body which afterward separated into two, or whether they separately condensed from neighboring clouds of the original nebula, the moon later being drawn nearer to the earth and its orbit rounded by the action of the resisting medium. The former theory has been very fully investigated both by Poincaré and Darwin, and though the methods of attack in the two cases were wholly different, the results are in remarkable agreement. By the former astronomer the development of a rotating, tenuous mass, or cloud, was examined: it was shown mathematically that if the velocity of rotation exceeded a certain limit, two separate centres of condensation would appear within the rotating mass. As these separated the mass would take a pear-shaped form: the constriction around the neck of the pear increasing, there would finally result two bodies almost in contact revolving about their common centre of gravity. At this time the length of the month must have been equal to the time of rotation of the earth; it has since been greatly lengthened by the enormous bodily tides which the two closely adjacent, plastic masses must have raised in each other, for it can be demonstrated that the effect of these tides is to rapidly push the two bodies apart and also to reduce the speed of rotation of each of them. The original energy of rotation of the moon being much less than that of the earth, its relative rotation was thus completely destroyed, so that now it turns always the same face toward us. In the same manner the relative rotation of Mercury with reference to the sun has been destroyed by the bodily tides produced on the planet while it was still in a nebulous or plastic condition.

Double-star Systems.— Whether the earth and moon originally formed one body which afterward separated into two through excess of rotation, followed by the action of bodily tides, is subject to grave doubt, but there is but little doubt that the evolution of double-star systems has taken place in substantial accordance with this theory. For here are numerous examples of two suns of approximately equal mass revolving about one another with their surfaces almost in contact, and it is most significant that in every such known case the spectrum of the system is that of the very early types of stars. The densities of these pairs are also very low, and on the whole it cannot be doubted that they represent a very early stage of the system's development. When we pass to a consideration of the wider (visual), double-star systems it is found that the circularity of the orbits has disappeared and that the stars have aged to later spectral types. It can be shown mathematically that the continued effect of tidal action is not only to push the bodies farther apart but also to increase the eccentricities (that is, to diminish the roundness), of the orbits.

We have thus apparently found a true and satisfactory account of the genesis and development of many of the double-star systems. But it should be added that there are many examples of pairs of stars which are drifting through space together, and which therefore belong to one system, but which are separated by distances so vast that it is quite inconceivable that any form of tidal action could have been effective in pushing them apart from a single body. The periods of such pairs are doubtless to be reckoned in tens, or even in hundreds, of thousands of years. It is reasonable to suppose that the common motion observed in these cases is merely the original motion of the nebula from which they, and perhaps other stars of the same stream, were a part. But when this explanation is to be replaced by that one which, as we have seen, accounts so fully for the development of closer pairs, we are not able to say.

Development of the Stars.— It is universally believed by astronomers that the stars have developed from nebulæ, but the exact mode of this development, and especially a knowledge of precisely what is taking place in certain phases of the nebulæ, is very uncertain. Roughly speaking, the known nebulæ can be divided into four great classes: (1) The vastly extended, faintly shining, very irregular, nebulous clouds, of which the nebula in Orion is a well-known example; (2) the small, round, planetary nebulæ, which frequently have a condensed nucleus in the centre; (3) the hazy, nebulous stars; and (4) the great host of Spiral nebulæ, which far exceed in number all others combined. It is a remarkable fact, thus far quite unexplained, that while the first three classes are most numerous in the neighborhood of the Milky Way, the spiral nebulæ are almost wholly wanting in this region but are found by tens of thousands in the most vacant areas of the sky.

It is probable that the first class of nebulæ represent the simplest form of inorganic substance known to us. Whether these inconceivably extended and tenuous clouds can under their own gravity become denser clouds, from which ultimately even stars may develop, we do not know. It is believed by some astronomers that certain of them, as, for example, the faint nebulosity in the Pleiades and the nebulous streams, are made up of inconceivably small particles, or ions, which have been repelled from hot stars, and thus are in a sense a disintegrated product, rejected in the course of the general stellar evolution. The spiral nebulæ are of such great size that it is doubtful whether the smallest of them visible to us could develop into a solar system more or less closely resembling our own. It seems more probable that from these a star stream, or even a star cluster, containing multitudes of stars, will eventually be produced.

All observation leads us to the conclusion that the majority of the nebulæ are of a heterogeneous structure; that is, that they are very far from being of a uniform density throughout their extent. It is not unreasonable to suppose that much of their material may condense into solid bodies, or meteoric particles, before the general development has proceeded far toward a condensation into many separate star centres. But this possibility has no important bearing upon the general history of the system's development. And whether the nebula is of so great extent that it develops into a multitude of suns or whether it is so very small that there results but one, the fact that the growth of each sun takes place in a resisting medium leads us to the conclusion that some of the nebulous matter will escape being drawn into the centre but will be left revolving around the central sun. Accordingly, it appears to us very probable that a vast number of the stars have worlds revolving around them and that our solar system is not unique in this respect.

T. J. J. See,

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COSMORAMA, a species of picturesque exhibition, consisting of 8 or 10 colored drawings, executed in body colors, laid horizontally around a semi-circular table, and reflected in mirrors placed diagonally opposite to them. The spectator looks at them through convex lenses placed immediately in front of each mirror. The exhibition takes place by lamplight only, and the lamps are so placed as not to be reflected in the fields of the mirror. The views exhibited are generally copies made from engraved views, such as those of Piranesi, De Nou, Le Bruyer and other artists. The pictures are thus seen not only enlarged but in perspective.

COSMOS, about 20 species of annual and perennial herbs of the natural order *Compositæ.* They are natives mostly of Mexico, whence several have been introduced into gardens for their bright flower-heads, which appear in late summer and during the autumn. They are rather tall plants with opposite pinnate, entire, or lobed leaves, and typically, red or purple flowers (yellow in one species), but in horticultural varieties white and other colors. Their long flower-stems make the plants useful for bouquets. Cosmos is especially popular in the United States because it is easily grown from seeds started in hotbeds, and because it thrives upon almost any garden soil and with the most ordinary care. The cultivated forms are derived mostly from *C. sulphureus* and *C. bipinnatus,* the former of which often exceeds eight feet in height, the latter rarely more than four feet. The flowers are often more than two and a half inches in diameter. *C. diversifolius,* sometimes called black cosmos, is widely known as a *Dahlia,* or a *Bidens,* and seems to be upon the border line between these genera. Probably no plant introduced into ornamental cultivation during the closing years of the 19th century offers such possibilities of improvement as cosmos. Since 1885, when there were few distinct varieties, so much improvement has been wrought that plant breeders are very hopeful. Comparing the typical species of chrysanthemum with its improved varieties will give an idea of what may possibly be accomplished with cosmos.

COSMOS. In the four volumes of 'Cosmos,' Alexander von Humboldt laid the foundations of modern physical geography and meteorology in their larger aspects. Begun in 1843, when the author was already 74, the work represented the slowly matured results of explorations made between 1799 and 1804 on the Atlantic, in Teneriffe, South America, Mexico and the United States, supplemented by extensive though rapid journeys in Russia and Siberia in 1829. It happily united the philosophic, though often vague generalizing of the 18th century with the 19th's demand for precision in detail and showed the author supreme in his day as co-ordinator of the great facts of plastic geography, climatology, terrestrial magnetism, the distribution of volcanoes, plants, animals and races, and a genial investigator into social and linguistic origins. The purpose of the book was, Humboldt said, «to comprehend the phenomena of physical objects in their general connection and to represent nature as one great whole moved and animated by internal forces.» Volume I (1845) gives, after a nobly conceived introduction of the study, a general review of natural phenomena; Vol. II (1847) incitements to the study of nature and a history of the physical sciences; Vol. III (1850, III and IV of the English translation) the results of observations of cosmic phenomena; Vol. IV (1858, Vol. V of the English translation) those of telluric phenomena. Parts of an unfinished fifth volume appeared in 1862. The style of 'Cosmos' is at times labored. One feels that Humboldt is not quite expressing his own conception of the dignity of his theme; but his descriptions of South American scenes are often powerful and his imaginative generalizations illuminating. The successive volumes of 'Cosmos' were translated on their appearance into most European languages. A German edition commemorating the Humboldt centenary was issued in Philadelphia in 1869. The influence of 'Cosmos' not alone on scientific thought but on the popular attitude toward science has been very great. Consult Stoddard, R. H., 'Life Travels and Books of Alexander von Humboldt' (1860).

Benjamin W. Wells.

COSORYX, a genus of antelope-deer (see Ruminants; Fossils) allied to *Merycodus* (q.v.), but with antlers of two equal tines. It is found fossil in the Miocene bad lands of the western United States, and is thought to be ancestral to the modern pronghorn antelope.

COSQUIN, kŏ-skań, **Emmanuel**, a French folklorist: b. at Vitry-le-François in 1841. His 'Contes Populaires de Lorraine' (1886) is his most important contribution to letters on account of its bearing on folklore. He has contributed many articles to *Le Français*, a Catholic and conservative journal; and has translated into French the works of Joseph Fessler: 'La Vraie et la Fausse Infallibilité des Papes' (1873), and 'Le Concile du Vatican' (1877).

COSSA, kŏs'sä, **Francesco**, Italian painter: fl. 1470. He lived first in Ferrara, and is considered one of the founders of the Ferrarese School of Painting; after 1470 he lived in Bologna, where he and his contemporary, Ercole Roberti, are said to have been the founders of the Bolognese School. His works include 'Madonna with Saint' (at Bologna), and frescoes in the Schifanoja Palace at Ferrara, which are remarkable alike for their fidelity to nature and their splendid studies of costume. The Berlin Museum and the Johnston collection, Philadelphia, have representative pictures by him. Consult Berenson, 'North Italian Painters of the Renaissance' (New York 1907).

COSSA, Luigi, an Italian writer on political economy: b. at Milan in 1831; d. 1896. He was graduated from the University of Pavia in 1853 as a doctor of law, and continued his studies in economics at Vienna and Leipzig, and, in 1858, became professor of political economy at his Alma Mater, and later at Milan. He is the author of 'Guida allo studio del l'economia politica' (3d Ital. ed., 1890; Eng. trans. 1893), 'Primi elementi di economia politica' (10th ed., 1895, 3 vols., of which the third volume, 'Taxation,' was translated into English in 1888).

COSSA, Pietro, an Italian dramatic poet: b. at Rome in 1834; d. at Leghorn 1881. He went to South America following the political events in 1840; but, returning to Rome, he taught Italian literature at one of the technical schools. A series of dramas having for their themes the stories of ancient and modern Rome comprises his main success in literature. These are 'Nerone' (1871); 'Plauto il suo Secolo' (1876); 'Messalina' (1876); 'Cleopatra' (1879); 'Borgia' (1878); 'Cecilia' (Giorgione's mistress), (1878). His best play is the 'Nerone,' an English version of which by F. E. Trollope, appeared at Rome in 1881. His 'Teatro Poetico,' in seven volumes, was published at Turin (1877-85), and a volume of lyrics in 1876. Consult Trevisani, 'P. Cossa' (1885), and Arcari, 'Di P. Cossa e del dramma in Italia' (1899); Mazzoni, 'L'Ottocento' (Milan); Franchetti, in 'Nuova Antologia' (1881); 'Works' (Turin 1887).

COSSACKS, tribes who inhabit the southern and eastern part of Russia, paying no taxes, but performing instead the duty of soldiers. Nearly all of them belong to the Græco-Roman Church, to which they are strongly attached, and to the observances of which they are particularly attentive. They must be divided into two principal classes, both on account of their descent and their present condition — the Cossacks of Little Russia and those of the Don. Both classes, and especially those of the Don, have collateral branches, distributed as Cossacks of the Azov, of the Danube, of the Black Sea, of the Caucasus, of the Ural, of Orenberg, of Siberia, of the Chinese frontiers and of Astrakhan. Writers are not agreed as to the origin of this people and of their name, but they are believed to be of mixed Caucasian and Tartar race. In personal appearance the Cossacks bear a close resemblance to the Russians, but are of a more slender make, and have features which are decidedly more handsome and expressive. Generally speaking, they are better educated than their Russian fellow subjects.

Originally their government formed a kind of democracy, at the head of which was a chief or hetman of their own choice; while under him was a long series of officers, with jurisdictions of greater or less extent, partly civil and partly military, all so arranged as to be able on any emergency to furnish the largest military array on the shortest notice. The democratic part of the constitution has gradually disappeared under Russian domination. The title of chief hetman is now vested in the heir-apparent to the throne, and all the subordinate hetmans and other officers are appointed by the Crown. Care, however, has been taken not to interfere with any arrangements which foster the military spirit of the Cossacks. Each Cossack is liable to military service from the age of 18 to 50 and is obliged to furnish his own horse. They furnish the empire with one of the most valuable elements in its national army, forming a first-class irregular cavalry and rendering excellent service as scouts and skirmishers. In 1570 they built their principal «stanitza» and rendezvous, called Tcherkask, on the Don, not far above its mouth. As it was rendered unhealthful by the overflowing of the island on which it stood, New Tcherkask was founded in 1895 some miles from the old city to which nearly all the inhabitants removed. This forms the capital of the country of the Don Cossacks, which constitutes a government of Russia, and has an area of 63,532 square miles and a population estimated in 1912 at 3,591,000, 98 per cent of whom are Cossacks. It has a military organization of its own.

Service begins at the age of 18 and lasts 17 years. All Cossacks able to serve belong, without age limit, to the reserve forces of the «National Defense.» Their war strength is said to be about 5,000 officers and 175,000 men, with more than 170,000 horses, and a reserve force of over 300,000 officers and men in case of emergency. About 88 per cent are Christians out of the whole population living on land assigned to the Cossacks. The non-Christian element is principally composed of Mohammedans. The Cossack lands cover an area of about 229,000 square miles. Their principal industry is agriculture and the breeding of horses and cattle. They are also greatly interested in the fisheries of the Don, Ural and Caspian, the vine-culture of the Caucasians and the bee-keeping of various districts.

The Don Cossacks have a regular history from 1554. In 1792 the Cossacks of the Cuban or Black Sea (Chernomorski) were formed; and other Cossack lines were subsequently established on the lower Volga, on the Terke, on the Ural River, in western Siberia, in the Transvaikal territory, in the government of Irkutsk, on the Amur, etc. The present military organization dates from Peter the Great; and their adoption of a thoroughly settled life, with its modern characteristics, is largely due to the government of that monarch and of Catherine II assisted by the ordinances of Nicholas I in 1835, of Alexander II in 1875 and of Alexander III.

The name Cossacks (*Kazaku*) is a name signifying the original character of these people, who were «freebooters» according to the Turkish idea. The name Kazak was given by the Byzantine Emperor Constantine VII, Porphyrogentius, to the Circassians and is still in use (for the same people) among the Georgians. Consult Khoroschin and Von Stein's 'Die Russischen Kosakenheere' (in Petermann's 'Mitteilungen'); Gogol's 'Taras Bulba'; and Byron's 'Mazeppa' (1820).

COSSACKS, kŏs-saks, **The**, a story by Tolstoi, published 1852. It is a series of picturesque studies on the life of the Cossacks of the Terek, rather than a romance. The story is particularly interesting as showing the first germs of the altruistic philosophy which Count Tolstoi has developed into a vigorous system of self-renunciation.

COSSÉ, kŏs-sā', **Charles de**, Comte de Brissac, French marshal: b. Anjou about 1505; d. Paris, 31 Dec. 1563. He served with success in the Neapolitan and Piedmontese wars and distinguished himself as colonel in the battle of Perpignan in 1541. He rose to the rank of grand master of artillery of France; and subsequently obtained the office of governor of Piedmont, and the baton of marshal of France in 1550. He afterward returned to France as governor of Picardy, and rendered that province important services.

COSSIO, kŏs'syō, **Aluigi**, Italian clergyman and educator: b. Cividale del Friuli 1874. He was educated at the Seminary of Udine and at the universities of Padua and Freiburg. He also studied at Tübingen, Stuttgart and Fribourg, Switzerland. He was ordained to the priesthood in 1897; served at various times as missionary to his countrymen in different parts of Europe, librarian of Saint Bede's College, Manchester, England, and Dante Society lecturer at Victoria University, Manchester. He was also successively professor of Christian archæology and the history of art at Upholland College, England, lecturer before the Dante societies of Dublin, Liverpool, Manchester and Queen's College, London, and official of the Sacred Congregation of the Consistory, Rome. He later was appointed auditor of the Apostolic Delegation to the United States at Washington, D. C. For purposes of literary research he visited the universities of Berlin, Bonn, Copenhagen, Kiel, Lund, Munich and Upsala. He has written 'Cardinal Cajetan'; 'The Vita Nuova of Dante'; 'The Archæology of Art in Dante'; 'The Doctrine of Art in Dante'; 'Art in Dante and his Artistic Preparation'; 'The Laudi MS. of Manchester'; 'Virgil'; 'St. Peter in Rome'; an edition of Dante. He contributed to 'The Catholic Encyclopedia,' the *Antiquary, Il Giornale dantesco* and other periodicals.

COST ACCOUNTING. See Accounting.

COSTA, Alfonso Augusto, Portuguese statesman: b. Ceia, Guarda, 1871. He studied at Coimbra, receiving his doctor's degree in 1895, and in the following year became professor of law. Known as an eloquent speaker, he affiliated himself with the Republican party and was elected by a great majority deputy to the Cortes, in spite of the machinations of government agents, 26 Nov. 1899. The ministry annulled his election on a futile pretext, but in the new elections, 18 Feb. 1900, he was again triumphantly elected. In the Cortes he was received as a recognized enemy of the monarchical régime, and he soon gave more than ample proof of his enmity by introducing, amid great protest, a resolution in the Cortes in which he proposed the abolition of the monarchy. After the fall of the ministry he failed to be re-elected, but threw himself enthusiastically into the preparations for the revolution which established the Republic in 1910. Under the new régime he became Minister of Justice, and in January 1913, Minister of Finance and Premier. The exiled Royalists in July 1913 made an attempt on his life, but he escaped with slight injuries; another plot to kill him in September 1913 was also frustrated. In March 1916 he became Minister of Finance in the Almeida Cabinet. Dr. Costa, more than any other one man, typifies the spirit of the new Republic of Portugal. He has written 'Direito civil' (1896); 'Economia politica' (1896–98); 'Organização judiciara' (1897–1901).

COSTA, kŏs'tä, **Isaac da**, Dutch poet and theologian: b. Amsterdam, 14 Jan. 1798; d. 28 April 1860. He studied at Leyden, receiving the degree of Ph.D. in 1821. By parentage he was a Portuguese Jew, but he embraced Christianity in 1822 and became a professor and director of the Free Scotch Church Seminary. He was called to the Institute of Amsterdam in 1840, and soon acquired a high reputation both for his poetic and theological works. Poetry he continued to write up till 1857, when his last poem, the 'Battle of Nieuwpoort,' was published. Among his theological works are a 'Refutation of Strauss'; 'Life of Jesus'; a 'History of the Destinies of the People of Israel' (translated into English and German); 'Considerations on the Spirit of the Age.' The more noteworthy of his volumes of verse are 'Prometheus' (1820); 'Poems' (1821–22); 'Festive Songs' (1828); 'Hagar' (1840). His poems were collected and published by Hasebroek (1861–62).

COSTA, Lorenzo, Italian painter: b. Ferrara about 1460; d. Mantua, 5 March 1535. He studied with Cosimo Tura at his birthplace and was influenced at first by Ercole Roberti and Francesco Cossa. He was employed to decorate the choir of the church of San Domenico in Ferrara, and was invited to the ducal court, where he painted a number of portraits of princes and nobles. Shortly afterward we find him at Ravenna, at Bologna, under the patronage of the Bentivoglio family, and there began his connection with Francia, with whom he worked as copainter. Here he executed a 'St. Sebastian Pierced by Arrows,' a 'Virgin,' a 'Saint James,' a 'Saint Jerome.' At Mantua, whither he was invited by Francesco Gonzaga, he painted the greater number of the pictures in the palace, then being restored by that prince. He left behind him a reputation for keenness of observation, correctness in design and great simplicity and grandeur in form, together with harmonious grouping. Other works include 'Isabella d'Este Crowned by the Muse' (Louvre) and 'The Dead Christ' (Berlin Museum). The young Correggio, who accompanied him to Mantua, was his principal pupil. Consult Morellis, 'Italian Painters: Critical Studies of their Works' (translated by Constance Jocelyn Ffoulkes, London 1892–93); Berenson, 'North Italian Painters of the Renaissance' (New York 1907); Gardner, 'The Painters of Ferrara' (London 1911).

COSTA-CABRAL, Antonio Bernardo da, Count of Thomar, Portuguese statesman: b. Fornas d'Algostra, province of Beira, 9 May 1803; d. San Juan de Flor, 1 Sept. 1889. He received his education at the University of Coimbra. He became judge of the Supreme Court in Oporto and in Lisbon, and in 1835 was elected to the Chamber of Deputies, where he was at first one of the leaders of the Radicals and then of the Conservative party. He was chosen Prime Minister 7 March 1838, but relinquished this position two months afterward. In 1841, however, he was reinstated. His oppression and misgovernment resulted in his being driven from power 17 May 1846. In 1849, however, he was reappointed Prime Minister, but only to inaugurate a still more stringent dictatorship. Impoverishing the people by his unscrupulous system of expenditure, contracting new loans and imposing new taxes, the outcry against him became so irresistible that his own brother Sylva, a member of his cabinet as Minister of Justice, would not any longer serve under him, and became leader of the opposition in the Cortes, which body was now determined on his overthrow. In the meantime, however, Saldanha set on foot a revolution at Cintra, which spread rapidly over the whole kingdom, and put an end to Costa-Cabral's administration 26 Feb. 1851. Saldanha became Prime Minister of Portugal and Costa-Cabral fled to England. He was Ambassador to Brazil 1859–61. In 1862 he became a member of the Council of State and president of the Superior Administrative Court.

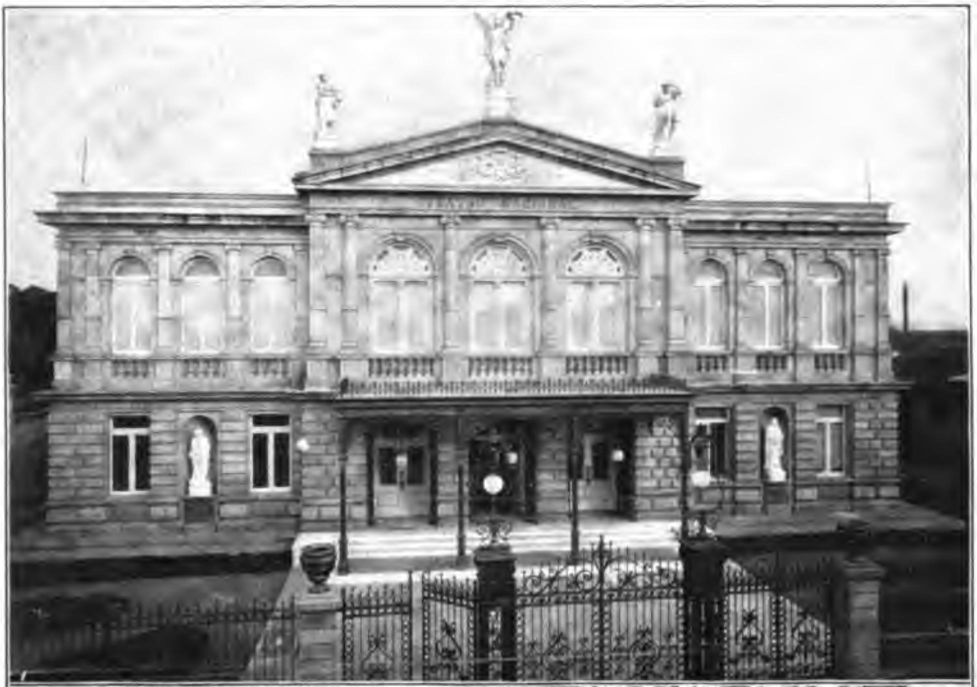
COSTA RICA. Physiography, Political Divisions and Population.— Costa Rica, a republic of Central America, is bounded by Nicaragua, the Caribbean Sea, Panama and the Pacific Ocean; area about 22,000 square miles. The republic is divided into seven provinces and these are subdivided into cantones, and the cantones into districts. Each canton has a municipal organization elected by the people; but the political chiefs of the cantons and the governors of the provinces are appointed by the president of the republic. The provinces are San José, Alajuela, Cartago, Heredia, Guanacaste, Puntarenas and Limón. The mountains do not form a continuous chain, but are divided into two main groups, that of the northwest and that of the southeast, the former including the volcanoes Irazú (11,200 feet), Turialba (11,000 feet), Barba (9,335 feet) and Poas (8,675 feet). Eruptions occurred in 1723, 1726, 1821, 1847, 1864 and 1866. The southeastern or Talmanca group, in which there are no signs of recent volcanic activity, includes the Buena Vista (10,800 feet), Chirripo Grande (11,850 feet) and Pico Blanco (9,650 feet). A transverse system, the Cordillera de Dota, below Cartago, renders communication between the northern and southern sections of the country exceedingly difficult. More than one-half of the area of Costa Rica lies between 2,900 and 6,825 feet above the sea and is covered with virgin forests, the vegetation being so dense that it is almost impossible to penetrate the interior of these regions save by way of the rivers. From the coast to a height of 2,900 feet are tropical forests and savannas; above 6,800 or 6,900 feet, approximately, are the regions of oaks and chaparrales, extending up to 9,800 feet; and subalpine or subandine flora characterize the regions between 9,800 feet and the tops of the highest mountains. The climate in general is healthful, fevers occurring only in regions of less than 150 feet elevation; but it varies greatly according to altitude. The coast lands and regions below 3,000 feet have a high temperature, ranging from 70° to 80° F., and in consequence a torrid climate. The temperate zone lies between 3,000 and 7,500 feet and is very healthful with a mean temperature of about 62° F. Winds blow continually and are a great cause of discomfort in the dry season, December to May. The annual rainfall averages about 100 inches. The tapir, deer, puma, jaguar, armadillo, iguana and many varieties of monkeys are found in the forests, a few species being peculiar to Costa Rica, while the rest belong as well to South or North America or both. Of *avifauna* there are 725 known species; of *reptilia* and *batrachia* over 130 species; and the species of fish are especially varied owing to the circumstance that those of the Pacific are almost wholly different from those of Caribbean waters. The flora is essentially tropical. There are mahogany, cedar, brazilwood, fistic oak and ebony in the forests. Coffee, bananas, maize and sugarcane are commonly cultivated. Rubber also is found.

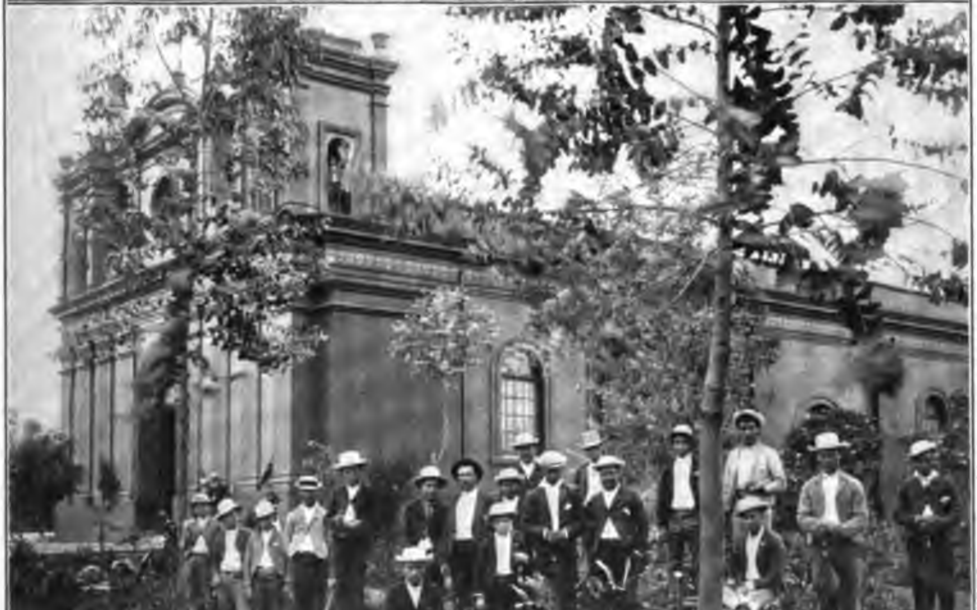
On 31 Dec. 1915 the official estimated population was given as follows:

San José	131,332
Alajuela	101,783
Heredia	46,162
Catargo	64,659
Guanacaste	40,806
Puntarenas	22,203
Limón	23,756
	430,701

The population in 1826 was 61,846, and mainly by increase of the families whose ancestors came from Galicia or Catalonia before

COSTA RICA





1 National Theatre at San José

2 A Country Church — Native Costa Ricans in Foreground

the date just mentioned, it had grown by 1915 to 430,701. In marked contrast with the other Central American states, Costa Rica's population, in the larger towns of the uplands, is almost entirely white. Only 3,500 Indians remained in 1916. The negroes (some 25,000 British West Indians) live near the coasts.

The obligation and "traditional" policy of Costa Rica is to solve its own problems and to avoid complications with other countries. The frontier line with Colombia (Panamá) was to a certain extent determined by the award of the President of the French Republic as arbitrator, 11 Sept. 1900. President Loubet's decision extended the Colombian frontier to Punta Carreta on the Caribbean coast, thus depriving Costa Rica of extensive territory to which she laid claim. But there is still contention between the interested countries in regard to the interpretation of the terms of the award; and it is with this qualification that the estimate of area in the first paragraph is offered. Previous estimates have varied between 23,000 and 34,000 square miles. On 20 Jan. 1902, a "Convention of Peace and Obligatory Arbitration" was signed at the Port of Corinto, Nicaragua, by plenipotentiaries of Costa Rica, Nicaragua, Honduras and Salvador.

History.— An account of the Spanish settlements at the beginning of the 16th century is given in the article Central America. The Spanish Crown in 1540 established the province of Costa Rica; in 1560 and 1573 defined its frontiers; in 1562 appointed Juan Vasquez de Coronado military governor of Costa Rica and Veragua. The city of Cartago, until 1823 the capital, was founded by Coronado, but it was a city only in name. During the first century of the existence of the province no headway was made. The Indian tribes were the most intractable of their kind; white settlers were few. A brief period of comparative prosperity began when Captain-General Sandoval, in 1638–39, made a new port at Matina and opened a road from it to the capital. The value of cacao plantations near the road increased, and the eastern coast, as well as the Gulf of Nicoya, was visited by trading ships. But the buccaneers swooped down upon the coast as soon as there was anything of value to be seized, and Indians completed the work of destruction. This wretched state of things continued throughout the 18th century. One hundred years ago Costa Rica was described as the most benighted, woeful province in the whole Spanish empire. Its colonists, ignorant and indigent, "clothed with the bark of trees," had been reduced to this condition of misery through being cut off from communication with the outside world for generation after generation and by century-long ravages of pirates from Europe and marauding bands of Indians from the Mosquito coast. But to-day the republic holds a leading position among Latin-American nations in regard to public instruction, and (except for the apparently chronic dislocation of the public finances) it can no longer be called a very poor country. Every Costa Rican who cares to do so can own valuable property of some sort, and the foreign commerce of the country is far from being contemptible. The change may be described in a few words.

Less than four months after proclaiming that Spanish control was at an end (15 Sept. 1821), Costa Rica with the other weak Central American states was drawn into a union with the Yturbide empire of Mexico. This dependence lasted until 1824, and then followed the experimental union of the Central American countries. But genuine independence began after 1830. Even in that time of extreme poverty the state acknowledged and declared that it could not postpone and would not shirk its duty to provide for the education of the people.

During the first half of the 19th century commerce received a new impulse through the discovery of gold in the mountains near the Gulf of Nicoya, and the extension of coffee culture. Several of the Presidents holding office since 1824 have been eminently patriotic and far-seeing men, under whose guidance the graduates of Costa Rican schools have begun to appropriate some of the natural resources of the land, with little aid from immigration, though not without the aid of foreign capital. Immigration up to the present time has been small.

In 1907 Costa Rica and all the other Central American states sent delegates to a conference in session at Washington, D. C., from 14 November to 20 December. This conference decided, among other things (see Central America), to establish a Central American Court of Justice and a Central American "pedagogical institute," both to be located in Costa Rica. The delegates expressed the opinion that each republic should have the right to maintain, at the proposed normal college, not more than 200 students of both sexes and they agreed to send not less than 20 students of each sex. On 20 March 1910 Costa Rica and Panamá signed a protocol setting forth the basis of fact for the arbitration of their boundary dispute by Chief Justice Fuller. In May, Ricardo Jiménez was inaugurated as President of the Republic. An earthquake wrecked a large part of the city of Cartago, including the new Palace of Peace. The estimated loss of life was 1,800. In 1913 the President in his message stated that the government was particularly solicitous for the advancement of education. Although more than one-eighth of the total revenue of the state had been expended for schools and colleges in the preceding year, Congress was asked to increase the inheritance tax for the benefit of the School of Arts and Crafts and the hospital fund. Among the measures passed by the Congress was a law limiting the armed force of the President (the regular army) to 1,000 men in time of peace and 5,000 in time of public danger from insurrection, etc. President Alfredo Gonzáles Flores, chosen for the term 1914 to 1918, was known to be the moving force responsible for legislation in favor of agriculturists and in defense of the rights and privileges of workingmen which engaged the attention of the Congress in 1915 and 1916. Costa Rica brought action in March 1916 against Nicaragua for the violation of her rights under the canal treaty with the United States, and the Central American Court of Justice, on 5 May, gave decision in her favor. General Federico Tinoco, after a bloodless revolution in January 1917, overthrew the González government and proclaimed himself provisional President of Nicaragua. By instructions from Washington, the American Minister to Costa Rica issued the following statement to the people of Costa Rica 2 Feb. 1917:

> "The government of the United States has viewed the recent overthrow of the established government of Costa Rica with the greatest concern, and considers that illegal acts of this character tend to disturb the peace of Central America and to disrupt the unity of the American continent. In view of this policy in regard to the assumption of power through illegal methods, clearly enunciated by it on several occasions during the past four years, the government of the United States desires to set forth, in emphatic and distinct manner, its present position in regard to the actual situation in Costa Rica, which is that it will not give recognition or support to any government which may be established, unless it is thoroughly proven that it is elected by legal and constitutional means."

Government.— The legislative branch of the government consists of a single house, called the Constitutional Congress; its 43 deputies, who are chosen, one for every 15,000 inhabitants, for a term of four years, assemble each year for a 60 days' session which may be extended for 30 days. One-half of the deputies retire every two years. The term of the President, in whom is vested the chief executive power, is four years. Congress annually appoints three presidential substitutes called *designados*. Administrative departments in charge of secretaries or ministers appointed by the President are six in number. An assistant secretary (*subsecretario*) assigned to an important bureau (for example, public instruction) reports directly to the Constitutional Congress. Judges also hold office for terms of four years. The main tribunals are the Supreme Court of Justice (11 justices) and two Appellate Courts (three magistrates each). Subordinate courts are established in the provinces. In the chief towns of each canton the alcaldes are judges of petty offenses, act as committing magistrates and have jurisdiction in the less important civil cases.

Education and Religion.— Elementary instruction of both sexes is by constitutional mandate compulsory and at the government's expense. The most recent statistics available (1915) show that about 35,000 children were enrolled as pupils in 419 elementary schools, controlled by local educational juntas for whose support the government had made a special loan and imposed certain taxes. In these schools there were 1,489 teachers. Higher education is provided at several provincial institutes, and at the Liceo and Colegio Superior de Señoritas — both of the latter in the capital. There are schools of law and medicine, a national museum, a national library, the University of Santo Tomas and the Physico-Geographical and Meteorological Institution. The government has made a practice of defraying the expenses of a number of young men who are sent as students to European universities. Dr. Claxton, Commissioner of Education, Department of Interior, government of the United States, writes: "In Costa Rica, which has made greater advance in respect to primary education than any other one of the Central American states, a very important movement in rural education has been started by the establishment of schools which are furnished with gardens, orchards, and fields, and which provide for rural industries carried on under a special program of instruction." (Report for year ended 30 June 1915). By executive decree of 14 Jan. 1915 rules for the newly-established Normal School at Heredia were promulgated.

The Roman Catholic is the religion of the state, but there is entire religious liberty under the constitution. The bishop of San José is a suffragan of the archbishop of Guatemala.

Spanish is spoken everywhere throughout the country, even in the Indian districts.

Industry, Agriculture and Commerce.— Coffee raising was for a long time regarded as the most profitable form of agriculture in Costa Rica, and the decline in the price of coffee brought on the financial crisis soon after the beginning of the present century. Coffee invoiced at the American consular agency at Puntarenas for the United States during 1916 amounted to 7,718,057 pounds, valued at $939,543. The systematic cultivation of bananas has increased during recent years to such a degree that it has become Costa Rica's leading industry. Indian corn, rice and cocoa grow readily. The live stock consisted of 33,000 cattle, 52,000 horses, 63,000 pigs, besides mules, sheep and goats. Because of the great number of peasant proprietors agriculture is advancing and both the economic situation and political stability of the country are on a sound basis. Until the year 1915 cattle were never exported from Costa Rica, but were extensively imported from Nicaragua at the rate of from 20,000 to 30,000 head annually. During the year 1915, however, 3,151 head of cattle, valued at over $100,000, were exported to the Canal Zone, Panama, for the United States military forces stationed there. Owing to the scarcity of cattle in this district it is not likely that they will continue to be exported to any extent. Prices of milk, butter, cheese and beef are much higher in Costa Rica than in the United States, and large quantities are imported annually. The cultivation of cacao is increasing in Costa Rica. In 1915 1,272,905 pounds, valued at $174,809, were exported. The Congress of Costa Rica, in 1917, provided for the payment of bounties to the growers of hemp, sisal and similar plants. This bounty, according to the *Revista Economica*, is to be in the form of 6 per cent treasury bonds, at the rate of 30 colon (colon = 46.5 cents) for each hectare (2.47 acres) of land planted in a fibre crop. The total amount of bounties is not to exceed 500,000 colones, and 100,000 colones more is appropriated for machinery. The bounty will be divided into three parts, the first to be delivered when the fibre is planted, the second part two years later and the third when the plants are ready to be cut. When the planter has cultivated his fibre crops for 10 years after receiving the first bounty, and has marketed his crops during this time, the mortgage which he has given on his property for the proper use of the bounty money will be canceled by the government. When owners of plantations representing 200 hectares of land or more wish to establish a common fibre factory the government will grant them a loan in treasury bonds for two-thirds of the cost of the installation, taking a mortgage for the amount of the loan payable in 10 years at 8 per cent with amortization of 10 per cent. In 1914 the imports were valued at $7,551,679, while the exports surpassed this figure by $3,310,069. In 1915 the imports were valued at $4,478,782 and the exports at $9,971,582. Exports in the last normal year before the European War, 1913, showed the following distribution: To the United States, $5,297,146; to Great Britain, $4,364,436; to Germany, $509,804; to France, $96,665. In the same year Costa Rica imported from the United States goods valued at $4,515,871; from Germany, $1,355,417; from Great Britain, $1,303,187; from France, $391,681. The following table shows the value of the leading exports for the last two years and the principal countries of destination, according to the customs statistics:

Exports and countries of destination	1914	1915
Bananas	$4,725,754	$4,427,566
United States	3,281,012	3,087,826
Great Britain	1,444,742	1,339,740
Cacao	84,507	174,809
United States	9,898	66,897
Great Britain	39,192	101,674
Central America	25,253	4,355
Coffee	4,663,360	3,730,307
United States	467,269	547,982
Great Britain	3,533,895	2,877,932
Germany	483,124	55,955
Gold and silver	888,599	805,897
United States	888,599	805,897
Hides (cattle)	110,780	151,064
United States	50,207	90,069
Germany	39,584	....
Spain	....	38,232
Rubber	12,134	49,488
United States	11,148	48,192
Germany	221	....
Timber	123,814	49,372
Cedar	81,711	16,908
United States	13,299	13,700
Germany	10,184	....
Chile	48,510	....
Mahogany	9,786	14,080
United States	2,934	3,911
Great Britain	3,302	8,370
Cocobolo	28,388	7,977
United States	21,971	7,970
Germany	6,277	....

Small establishments for the manufacture of saddles, harness, shoes, hats, clothing, cigars, cigarettes, candles, soap, beer, alcoholic liquors, carbonated waters, etc., exist in various parts of the country. There are officially enumerated 3,296 factories and industries in the Republic, including coffee-drying establishments, starch, broom and woodwork factories.

Mining and Manufactures.— From mines near the Gulf of Nicoya the exports of gold and silver bullion in a single year were $792,847. In 1913 gold and silver to the amount of $1,021,437 was mined and exported, and to the amount of $805,897 in 1915. The production of one of the three principal auriferous districts has exceeded the sum of $10,000,000; and in view of the circumstance that this sum has been produced by the crudest mining and metallurgical methods, the reward which would follow the proper application of capital sufficient to operate on a large and modern scale is surmisable. There are deposits of iron, nickel and manganese in several cantones. One manganese mine is in operation in Costa Rica. It began shipping in May 1916, and is now sending out about 300 tons a month, all in bags. It is making preparations to install an equipment of docks, furnaces, etc., with a capacity of 3,000 to 5,000 tons a month. An oil company has acquired rights to oil lands in Limón, Guanacaste and Puntarenas.

There are very few manufacturing establishments in the Republic. Among these few are the National Foundry at San José and the National Liquor Factory.

Banking and Finances.— The gold standard was adopted in 1896; in 1900 gold certificates were redeemed and gold put into circulation. The unit is the colon. The gold coins are 2, 5, 10 and 20 colones; the silver coins 5, 10, 25 and 50 centimos. The principal banks are the Banco Anglo-Costarricense, established 1863, the Banco de Costa Rica, established 1877, and the Banco Commercial (1908). In addition to these three banks the government has established, as a temporary measure to cover the deficit of revenues and assist their merchants and farmers over the crisis which the European War intensified, the Banco Internacional, with a restricted issue of bank notes to the extent of 4,000,000 colons (or colones), secured by a new issue of 2,000,000 colones, 6 per cent interior bonds, in conjunction with 2,000,000 colones, exterior refunding bonds, which in 1915 were in escrow in a New York bank.

The unit of the monetary system, the colon, is divided into 100 centimos and is used only in Costa Rica. Its weight is 0.7780 grammes of .900-fine gold, or, say, 0.7002 grammes of pure gold, which gives it a par value of $0.46536, currency of the United States. The par value of $1.00, currency of the United States, is 2.14887 Costa Rican colones. Under normal conditions, the commercial rate of exchange in Costa Rica for sight draft on New York fluctuates between 2.13 and 2.18 colones per $1.00 currency of the United States. «The circulation consists of banknotes, backed by gold and other assets of the issuing banks. Foreign gold coins are legal tender in Costa Rica at the following rates: American dollar=2.15 colones; French franc=0.4125 colones; German mark =0.51 colones; English sovereign=10.45 colones. The situation in Costa Rica has been complicated by the failure, in February 1915, of the Banco Comercial de Costa Rica [of Limón, not the Banco Comercial of San José]. In order to facilitate the circulation of the notes issued by the new bank mentioned above, the government has decreed that all obligations which are to be liquidated in colones, or in other agreed-upon moneys, shall enjoy the privilege of a moratorium until one year after the signing of European peace, unless the creditors are willing to accept payment in bills of the Banco Internacional de Costa Rica.» ('Latin American Monetary Systems'). One of the results of the Pan-American Financial Conference held at Washington in 1915 was noted, as follows: Costa Rica arranged with New York bankers for a credit of $500,000, making New York exchange available in transactions between the two countries.

National Debt.— The total debt in 1915 was $19,000,000, of which about $8,000,000 was English credit, $7,000,000 was French credit and $4,000,000 scattered. The economic problems of the government were acknowledged in the inaugural message of President Esquivel, 2 May 1902, to be «grave and complicated.» The total foreign debt in 1901 was £2,080,000; it was contracted in England in 1871 and 1872. In March 1901 Costa Rican bonds to the value of 642,300 colones were incinerated, having been issued in 1897 and 1899, and subsequently redeemed. The revenue of the government is derived from custom-house duties, the liquor monopoly, tobacco, stamped paper, post-office, etc., the export duty on coffee having been abolished 1 Sept. 1901. The government revenue in 1915 was $2,945,517 and the expenditures for the same year amounted to $4,257,511. In 1917 the estimated income was $3,937,700 and the expenditure $4,407,200.

Weights and Measures.— The libra = 1.043 pounds; manzana = 1⅙ acres; centaro = 4.2631 gallons; fanega = 11 bushels. The metric system was established by law, 10 July 1884, but has not entirely displaced old weights and measures.

Transportation and Communication.— The Costa Rica Railway runs from Limón to the cities of the central uplands, and has several branch lines; the Pacific Railway connects San José with a good harbor on the western coast. In all, there were, in 1916 in Costa Rica, 693 kilometers (433 miles) of railways, of which 134 kilometers (84 miles) were owned by the government. The lines are the Northern Railway Company, 225 kilometers (140 miles), and the Costa Rica Railway, 334 kilometers (208 miles). As the latter is leased to the Northern they together form a system of 348 miles under one management. The rapid growth of the banana trade has called into being railway lines in the coast regions. The Northern Railway has an extension down the coast southward from Bananito River, near Port Limón, with short branches running into the fruit districts. A line was also being extended northward in 1917. Between Limón and New Orleans and Mobile there is direct communication by steamship lines several times each week. Between Limón and New York steamers run weekly. There is a regular service between ports of the Central American coast, from Colón to Belize. Sailings to Jamaica, Cuba and England are fortnightly. French and Italian steamers call at Limón once a month. On the Pacific Coast there are three regular lines touching at Puntarenas: the Pacific Mail and the Chilean and British lines. There are (1915) 147 telegraph offices and 1,600 miles of wire and 640 miles of telephone lines. Wireless telegraphy with 300 miles radius is in operation at Limón, and there is a small station at Colorado, at the mouth of the San Juan River.

Army.— All male citizens between the ages of 18 and 50 may be called upon to do military service; the standing army, however, and the militia together numbered 36,946 and consisted of 3 brigades, 1 battalion, 3 companies and 135 unclassified soldiers (1917). Supplementing land forces are two government-owned motor launches used principally for revenue purposes.

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COSTER, kŏs'tĕr, or **KOSTER, Laurens Janszoon,** a reputed Dutch inventor of printing by movable types. By many he is regarded as a predecessor of Gutenberg, by some as a mythical personage. The first account of the invention which has any historical value appeared in 1499 in a book called 'The Chronicle of Cologne.' The author says that printing was invented in that city; he asserts, however, that the art was prefigured by the method used for printing certain schoolbooks or Donatuses in Holland. The next statement of importance in connection with the controversy is that of Hadrianus Junius, in his 'Batavia' (1588) to the effect that about 1460 Laurentius Joannes, surnamed Æditııus or Custos (literally sacristan, *Coster*), who lived in Haarlem, fashioned the bark of a beech-tree into letters, which he impressed upon paper. He then made a number of wooden letters and invented an ink thicker and more viscid than the common sort, and afterward made, by the addition of his letters, explanations for pictures engraved on wood; and eventually printed books. Among these was an edition of the 'Speculum Salutis.' He subsequently changed the wooden letters for others of lead, and these again for letters of tin. An assistant, who was a member of the Gutenberg family, stole the types and appliances, going first to Amsterdam, thence to Cologne, and finally sojourning at Mainz, where he published various books. This statement has been scoffed at as an invention or based on mere hearsay; but in recent years the trend of opinion has been in favor of the Dutch claims. There are no specimens extant that can with absolute certainty be ascribed to a printer called Coster. Coster's claim was disproved by Van der Linde, who proved that Coster was a tavern-keeper and was confused with Lauren Janszoon, a wine merchant and town officer. He asserts that Coster's claim to the invention was made by Gerritt Thomoszoon in 1550. Many fragments of books, however, have been discovered, believed to be printed much before the date of Gutenberg's earliest work. These are known as Costernian, and their number is being gradually added to since the attention of librarians has been called to their importance. They are printed in a variety of types of Dutch design. All are without any name, date or place, and nearly all were discovered in the bindings of the 15th century manuscripts or printed books. Consult Van der Linde, 'De Haarlemsche Costerlegende' (1870), translated into English by Hessels as 'The Haarlem Legend of the Invention of Printing' (1871); De Vinne, 'Invention of Printing' (1876); Hessels, 'Haarlem the Birthplace of Printing' (1887); Morley, 'English Writers' (Vol. VI, London 1890); also Wysz, 'Zentralbatt für Biblioteksweseṇ' (1888).

COSTMARY, or **MINT GERANIUM,** a species (*Chrysanthemum balsamita*) of the genus *Chrysanthemum,* of the thistle family (*Compositæ*). The plant is a native of Italy, whence it was introduced into England in 1568, and cultivated for its fragrant leaves, which were used in ale and various aromatic drinks; and also as a salad. In America the plant grows wild from Nova Scotia to Ohio, having escaped from gardens. Another common name is alecost or alecoast. The name is popularly supposed to mean "the fragrant plant of the Virgin Mary," but recent authorities incline to derive it from the Latin *mare*, the sea.

COSTUME ("custom"; and especially usage, habit or appearance in dress, etc.), a term now restricted to external dress and its modes. The history of costume is an exceedingly difficult one to trace in any accurate detail, owing to the difficulty of interpreting the vague and scanty notices on the subject which we can collect from the earlier writers. The most interesting and profitable thing will be to attempt to work out certain general lines of development, leaving minute questions to antiquarians who have made a special study of the subject, as far as anything can be accurately known about it. It must be observed that our earliest indications on the subject come from warm or semi-tropical countries; thus eliminating as far as possible the factor in the development of clothes which originates in the necessity of protection against the weather. Considerations of modesty, which may be regarded as the outgrowth either of specifically Christian or of other highly civilized conditions, according to the point of view, appear only in a rudimentary form. The development in early times is regulated largely by the desire to make the dress tell something of the position or rank of the wearer. Thus the earliest distinction as to the amount of clothing prescribed by custom seems to have been that the wearing of many clothes was a mark of rank, while the lower classes were content with a very scanty covering. This would follow since the nobles had in those days very slight need for active exertion; while practical considerations would dictate the minimizing of the garments which might hamper those whose employments required free movement of the limbs.

The early Egyptians seem to have worn little besides an apron or loin-cloth; under the later dynasty it was extended into a long skirt, which was combined with the jacket that had been sometimes worn to form a complete garment. The women wore the *calasiris*, a shirt with short sleeves or none at all. Light and frequently transparent materials seem to have been most commonly used. For a headdress, both sexes wore what is known as the sphinx-cap. Here, as elsewhere, however, ordinarily people paid very little attention to dress; kings, priests and other officials were distinguished by elaborate vestures. Under the Ptolemies Greek costume was generally introduced. The Assyrians covered more of the body than the Egyptians and used heavier stuffs — cotton, linen, wool and possibly silk, introduced from China. They wore a long shirt with short sleeves, and confined at the waist. For the upper classes this was bright-colored and ornamented with heavy fringes. Sandals were worn. The king was distinguished by a purple mantle and a white cylindrical cap. The Persian costume was generally tight-fitting, consisting mainly of a short coat and trousers (which seem to have originated very early in Central Asia), often made of leather. When they conquered the Medes, they adopted very generally the dress of the latter, which was loose and usually woolen. The leather breeches remained in use among the lower classes.

The Greek costume was characterized by great simplicity and fell into graceful folds. The principal parts of it were an undergarment called the *chiton* and a sort of cloak known as *himation*, which, when folded over the shoulders, ultimately originated a separate garment, the *diploïdion*. Men wore the *chlamys*, a short cloak for the more active occupations to which the *peplos* of the women partly corresponded. White was the usual (though not, as formerly believed, the exclusive) color of Greek garments; the material was most usually woolen among the Dorians and linen with the Ionians. Silk was introduced rather late from Asia and employed to make the semi-transparent robes for which the island of Cos was famous. Oriental luxury increased as time went on, until in the Byzantine period, while clothes retained much the same shape, costly material and rich ornamentation distinguished them.

The Romans also commonly wore but two garments, and the hardy, vigorous life of their early days tended to keep these simple. They wore a woolen tunic for the house, only one at first, until the increase of luxury brought in the custom of wearing two or three in cold weather. Women also wore an outer robe known as the *stola*, similar to the Greek *chiton*. For appearance in public there was for men the *toga*, a large, loose, white cloak adopted by all citizens for outdoor wear, and a somewhat similar garment called *palla* for women. While, however, men had a uniform manner of wearing the *toga*, women draped their robes in many graceful shapes at will. Shorter, more practical over-garments, such as the *lacerna* and the *sagum* or soldier's cloak, were worn by those engaged in more active occupations. The *torque*, or cord of gold fastened around the neck, was a fashion introduced from Gaul after the conquest.

The history of fashion in the Christian era may be divided into four periods:

First Period.— In the first, down to 486, the Gallic, Roman and Byzantine elements were combining to form a new costume. In the second, 486 to 1300, this underwent many changes. The nobles vied with each other in introducing new fashions, though the middle class were far slower in adopting innovations, and the peasantry kept the traditional form almost unaltered down to the time of the Crusades. The third is the Renaissance period of transition, leading down to the fourth or modern era.

With the Roman conquest of Gaul came the introduction among the conquerors of the *braccæ* or breeches of the Gauls, first adopted for campaign wear by the Roman soldiers. As the empire went toward its end, extravagance in dress was unbounded among the wealthier classes. The women wore a sleeveless outside tunic confined at the waist by beautiful bands and on the shoulders by jeweled clasps. They delighted in wearing tunics of bright colors held in such a way that at least some portion of each tunic was revealed and brought into contrast with the others. A bright transparent veil sparkling with green and silver spangles fell from the head and a short mantle hung from the shoulders. A sort of cornet or *strophium* fastened the veil to the head, and jeweled garters bound at the knee drawers of fine linen.

Sumptuary laws were passed relating to the style of shoe to be worn by each class; but similar laws relating to the variety of jewels had little effect, since the general love for ornaments was too strong to be regulated.

Second Period.— During the Merovingian era (486–751) in France no important modification of the general scheme of clothing came in. The ruder element introduced by the rough Franks gradually softened beneath the enervating, refining influence of Roman fashions. The Frankish women who had been content with their simple costume of a black robe, a tight-fitting mantle and a cap were transformed to Merovingian ladies delighting in gay, trailing tunics of delicate tissues exquisitely embroidered. Their arms were still bare according to the ancient Teutonic fashion. Their hair fell in long braids and was ornamented with fillets and flowing veils. As France acquired unity, the influence of both Roman and barbaric invasion visibly faded away. From the ancient shapeless tunic developed the gown, fitting closely to the waist and hips and having the skirt full and flowing. This was the general principle of form from the accession of the Capet dynasty (987) down to the Renaissance.

Men's dress underwent little change down to the 12th century. The costume of the Frankish men of Charlemagne's time may be described as the approximate model. It consisted of two tunics, the outer one of wool or silk varying in length from the hips to the knees, according to the prevailing style. These were covered by a blue mantle, fastened on the right side with a clasp, and often highly ornamented and trimmed with beautiful furs and gold fringes. Head coverings of diverse and increasingly extravagant styles were among the first distinctive modifications; and these were sometimes combined (as also in the development of academic costume) with a hood or cape falling over the shoulders.

Each century saw its own modification of these general types. It was a growing fashion in the 9th century for women's outer robes to stop at the knee and show a full sweep of the contrasting tunic beneath. In the 10th and 11th centuries the robe was belted by a rich girdle both above and below the waist. In the 11th century, too, the long train, in vain anathematized by the Church, became extremely popular. Sleeves reached the limit of absurdity in the dress of both sexes. At various periods the leg-of-mutton sleeve was worn, and in the beginning of the 15th century the outer sleeve widened at the wrist until it swept the ground. Commercial relations with the East were improved through the Crusades, and new varieties of costly fabrics were introduced. The splendor displayed in armor and military appointments affected the customs of the women. Ladies of noble birth emblazoned their close-fitting gowns and surcoats. Even the dress of the middle classes, many of whom were dependents of the nobles and wore livery colors and armorial badges, acquired a heraldic character. The helmets, decked with scarfs and mantlings, suggested many grotesque varieties of feminine headgear, both in the 14th and 15th centuries. As the mantles of the knights but partly concealed their armor, so a surcoat worn by ladies only half concealed the beautiful decorated gown beneath. This surcoat was a jacket of varying shape; at one period it was only a coat without sleeves or sides; later a loose, flowing skirt was added to it, which in the 16th century stopped at the knee. The hip-girdle, of exquisite workmanship, which showed through the openings of the surcoat, was a counterpart of the military belt worn by the knights.

The end of the 14th century was marked by the excess to which the more fanciful devices of the period were carried. Robes were more fantastically cut along the edges, and decked with trailing ribbons, accompanied by a trailing tail to the hood. The pointed toes of shoes were often two or three times the length of the foot. The odd parti-colored gowns of the women blazed with heraldic impalements and quarterings. During the 13th, 14th and 15th centuries there was great confusion about those garments which we know as stockings and trousers. One garment sometimes reaches the waist, even covering the feet. At others there were two articles, the nether stocks (Fr. *bas de chausses*) came to the thigh or knee and were continued by the trunk-hose or upper hose (Fr. *haut de chausses*). About 1600 the word breeches came into use to indicate the trunk-hose, and the term hose was confined to stockings.

Third Period.— This epoch was the transition from the mediæval to the modern style of dress. Speaking generally, up to the 14th century, long dress prevailed, loose and flowing, and offering a welcome contrast to the tight-fitting armor of the knight. About 1350 the costume of the men began to change, with the introduction of the doublet, a short jacket padded at the shoulders, plaited a few inches below the waist and fastened with a belt. The nether stocks, now entirely exposed to view, were attached to the trunk-hose. Long, loose robes with immense drooping sleeves were indeed worn throughout the 15th century, but only by professional men or nobles on occasions of state. In women's dress the tendency appeared to cut the figure into sections instead of keeping to the girded gown. A bodice reached to the hips. The dress was somewhat shortened, and thus a step was taken toward the short hooped petticoat. During the Renaissance Period full forms became more and more popular, and petticoats and skirts spread into the form of a bell, which year by year increased in circumference.

Fourth Period.— A more distinct transition between ancient and modern dress took place in the 16th century. Men wore for show a short cloak which hung from the shoulders. The doublet was made with rather tightly fitting sleeves; beneath it was a sleeveless jerkin fitting the body and, like the modern waistcoat, so cut as to allow the beautifully embroidered shirt to be seen. The short skirt of the doublet was gored to fit the bulging trunk-hose padded with hair, while the lower hose were plain and tight, so that the figure looked broad and full above and narrow below. In this century began the wearing of the top of the nether garments loose, or slashed, with pieces of different colors set in. The arms and shoulders of the doublet or jacket were similarly trimmed. Boots were worn loose, with the upper part falling down. Ruffs, or ruffled collars, and velvet bonnets with feathers came into use.

In England the Tudor Period was characterized by great extravagance. The chronicler Hall describes several of Henry VIII's superb dresses, among them a «frocke» or coat of velvet embroidered all over with gold, the sleeves and breast cut and lined with cloth of gold and tied together «with great buttons of diamonds, rubies and Orient pearls.» The cloaks and mantles were of corresponding magnificence. The shirts were pinched or plaited and embroidered with gold, silver or silk. The shoes and buskins were of the German fashion, very broad at the toe, and of velvet and satin, slashed and puffed. A plain russet coat and a loose kind of kersey breeches, with stockings of the same piece, constituted the ordinary dress of middle-class men. The London apprentices wore blue cloaks in summer and gowns of the same color in winter, as badges of servitude; for this was a period of domestic distinctions, relics of feudalism. The women wore long woolen gowns, worsted kirtles (hereafter called petticoats) and white caps and aprons. About this time white underlinen came into general wear.

In Elizabeth's time the men's huge trunk-hose, «stuffed with hair like woolsacks,» were made of silk, velvet, satin or damask. The doublets were very costly, quilted and stuffed, «slashed, fagged, pinched, and laced.» The cloaks were of Spanish, French or Dutch cuts; of cloth, silk, velvet or taffeta; of all colors; trimmed with gold, silver, silk-lace and glass bugles; equally superb inside and out. Hats now began to supersede the bonnets of the former era. They were for the most part made of felted wool, dyed. Those of beaver were exceedingly expensive.

The most conspicuous features of women's dress in the reign of Elizabeth were the farthingale and the ruff. The former consisted of an extravagant expansion of the lower garments by means of cane or whalebone. It was the predecessor of the hoop, which in its turn was succeeded by the crinoline. The widely extended ruff of fine linen, like a huge frill, is familiar from the pictures of Elizabeth and Mary of Scotland. The extravagance of the ruff reached such a point that it was anathematized from the pulpit, together with the extremely low cutting of the bodice; and the fancies of women's costume were denounced in a sermon preached before James I, at Whitehall, as «her French, her Spanish, and her foolish fashions.»

England was slower than France, but ahead of Spain, in abandoning the farthingale and the ruff. In the beginning of the reign of Charles I dress was little changed; the ruff, of thinner make, stood farther away from the throat and looked like a framework of gauze, but the skirts were not so wide. In the middle of the 17th century there came a revolution against the entire system of padding, whalebone, starch and wire, and for about 50 years the upper classes followed the canons of beauty and grace. Instead of the ruff, the Van Dyck collar, made of rich point-lace, was worn hanging down on the shoulder and held by a cord and tassel at the neck. Long breeches, fringed and pointed, met the ruffled tops of the boots; an embroidered sword-belt, worn over the right shoulder, held a Spanish rapier. In the flapping beaver hat hung a plume of feathers fastened by a jewel. Ladies' dresses were still made with skirt and bodice, the bodice defining but not cramping the figure, and the skirt hanging full and gracefully.

During the latter half of the 17th century, France, more than ever, gave the law to Europe in dress, and the typical style of the period is known as that of Louis XIV — although, for accuracy, a distinction must be made between the gay and brilliant and the sombre parts of his reign, in the latter of which a tendency toward sober plainness not unlike that of the English Puritans was felt. The result of long struggles with inconveniences of dress was a nearer approach to the modern masculine dress of three pieces, coat, waistcoat and trousers. The richly laced and embroidered doublet was long and loose, and had large puffed-out sleeves reaching a little below the elbow. The rest of the arm was covered by the full sleeves of the shirt. The long, loose, sleeveless waistcoat showed beneath the doublet, and the wide, ruffled breeches were fastened at the knees with bunches of ribbon. The doublet had buttons and buttonholes for its entire length, thus becoming a coat. Instead of the lace collar the long, square-ended cravat was worn. In the early part of the 18th century this dress became more exact in shape and sober in tone. The doublet, now a coat, fitted the body. The absurd wide «petticoat breeches» were exchanged for close-fitting garments tied below the knee. The broad-brimmed hats were turned up on two sides, later on three, and edged with feathers or ribbons. Wigs, which had been some time in use, were worn still longer than before, hanging down in front or flowing upon the shoulder. The coats of the 18th century were of velvet, silk, satin or broadcloth and of fanciful colors. Hogarth's favorite color was sky-blue, Reynolds' deep crimson, and Goldsmith rejoiced in plum-color. Meanwhile women's dress had also become more stiff and formal. Long bodices were tightly laced over very stiff corsets; overdresses were bunched up in the neck and on the hips; and the hoop-skirt, as outrageous as the farthingale of the 16th century, was generally worn. About the middle of the century the sacque came into style — a loose gown, resembling the mantle of antiquity, which was looped over the hoop-skirt and furbelows or left trailing behind. Heavy towering headdresses replaced the simple ringlets of the previous century. Small muffs, flowing veils and fans were important accessories. Muffs were carried for a time by men.

The formalities of the 18th century received a severe blow from the general tendency of the French Revolution toward simplicity. In the 10 years from 1790 to 1800 a more complete change was effected in dress by the spontaneous action of the people than had taken place in any previous period in the century. The change began in France, partly to mark contempt for old court usages, and partly in imitation of certain classes in England, whose costume the French mistook for that of the nation generally. It consisted of a round hat, a short coat, a light waistcoat and pantaloons reaching to the ankles and fastened by buttons. A handerchief was tied loosely around the neck, with the ends long and hanging down, and showing the shirt collar above. The short hair *à la Titus* was unpowdered, and the shoes were tied with strings in place of the buckles which had before been universal. This comparatively simple form of dress found many admirers in England and soon became common among the young men. The abandonment of hair-powder followed the imposition of a tax on its use, and with the giving up of wigs and powder came the fall of the cocked hat. Pantaloons which fitted closely to the legs remained in general use until about 1814, when the wearing of looser trousers, already introduced into the army, became fashionable, though many elderly persons still held to knee-breeches against all innovations. The general simplifying of dress subsequent to 1815 was not allowed to pass without a last effort to retain the elaborate fashions of the preceding period. The *macaroni* of the 18th century was now succeeded by the *dandy,* who prided himself on his starched collars, his trouser-straps, and the flashy bunch of seals which dangled from his watch-chain. The period covered by the Regency in England was indeed the heyday of this kind of dandyism; but even later it characterized not a few leading public personages.

The end of the 18th century witnessed a signal change in the style of women's dress. The gown no longer consisted of two dresses, an under and an outer one. The formal styles which had prevailed throughout the century and brought into use stiff materials such as solid damasks, velvets, satins and silks, were replaced by the fashion of the short-waisted clinging gown made of muslin and soft silk. This "Empire" mode characterized the dress of the first quarter of the 19th century. Large, loose, warm coats and cloaks were used for outdoor wear. Elaborate hats, turbans and caps were worn on all occasions. In the twenties there was another revolution. Skirts were shortened and trimmed with flowers, puffs and ruchings; sleeves became fuller, and the waist came nearer its natural position. Then the sleeves began to widen and stiffen, and the hats grew larger and more cumbrous. From these wide skirts the crinoline was evolved in 1854. In the seventies the skirt became narrower again, worn with a polonaise of a different color. Meanwhile the size and shape of the sleeve was not constant for more than a year.

But it would be both impossible and profitless to follow the minute variations of changing fashion. To return to general principles, it is safe to say that neutrality is becoming more and more the basis of costume, at least for men. Extravagance in dress, especially among the Anglo-Saxon nations, has become a note of bad taste; and man's dress, which was formerly characterized by gorgeous display, is little more than a uniform which, with certain variations prescribed by etiquette, adapts itself to different functions and amusements. As a result of the general modern abandonment of formality, and the opening of new employments for women, together with their invasion of the realm of athletic sports, the simplicity which characterizes the masculine dress has come to exist more and more also in the feminine. Fashion is forced nowadays to accommodate itself, to some extent at least, to health and convenience; and only the artist and the antiquarian will be found to regret that the picturesque costumes of bygone days are to be seen only among the peasantry of distant and isolated lands.

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COSTUME, Academic.— The use of caps, gowns and hoods in the United States has been continuous since Colonial times. Columbia College continued the custom of Kings College in the city of New York which had transplanted to American soil many of the regulations of Oxford and Cambridge. The code, however, was modified and lost much of the high color so noticeable in Great Britain. The University of Pennsylvania, New York University, Trinity College (Hartford, Conn.), Saint John's (Annapolis, Md.), University of the South (Sewanee, Tenn.), and Hobart also had codes in force before 1880. There was, however, no system discernible and few persons knew the distinguishing marks of the costumes for the various degrees. Few hoods were in use and some of them were worn by clergymen and by the congregations were supposed to be articles of ecclesiastical rather than academic costume. In fact, there is an intimate connection between the two as the mediæval universities were maintained by clerics and the forms of caps, gowns and hoods were merely the mediæval forms of clothing, retained and made regulation for the clergy when the lay community changed to more modern dress. Caps were a necessity in the cold churches; copes and capes with hoods attached were needed for warmth, and the hood was selected by the university men as the article to be made distinctive for the various degrees by color, trimming and lining. As the British universities passed from the control of the ecclesiastics, the costumes took on brighter colors, the dress or convocation robes for the doctors being of scarlet cloth, about the same color as the hunting coats and the old army uniforms.

The use of scarlet for dress use in doctors' gowns and for doctors' hoods is about the only tendency toward uniformity to be found in the British usage, all the codes of the British, Irish and Colonial universities being purely empirical. The codes of Oxford, Cambridge, Edinburgh and McGill (Montreal) are given herewith.

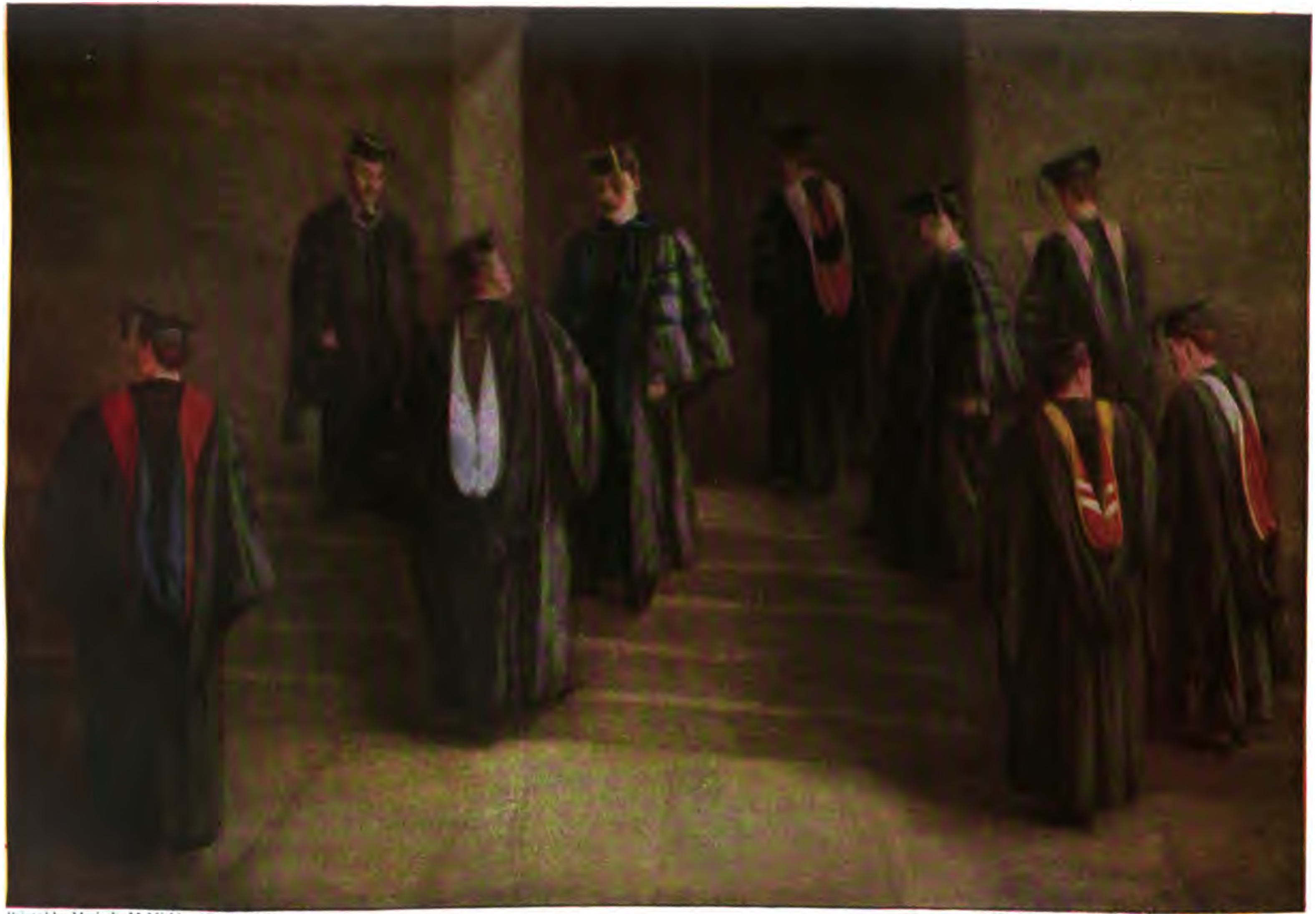
Painted by Maria L. McMickin, Albany, N. Y. [illegible]

[illegible]

D. D. [illegible] LL.M M. D. [illegible]

[illegible] has been [illegible] however [illegible] of the higher [illegible] University [illegible] University, Trinity [illegible] Saint John's [illegible] the [illegible] few persons knew the [illegible] the costumes for the [illegible] hoods [illegible] in use and [illegible] worn by clergymen and [illegible] were supposed to be [illegible] than academic costume [illegible] universities [illegible] forms of [illegible] variety the mediæval [illegible] regulations [illegible] constantly changed [illegible] a necessity [illegible] with hoods [illegible] the [illegible] universities [illegible] the same [illegible] old [illegible]

[illegible]



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AMERICAN INTERCOLLEGIATE SYSTEM

D.D. (Yale). LL.M. M.D. (Columbia). PH.D. Litt.D. (U. of Pa.). LL.D. Mus.D. B.S. (Cornell). M.A. (U. of Chicago).

UNIVERSITY OF OXFORD.

B.A.
Gown. Black stuff.
Hood. Black stuff, trimmed with white fur.

Litt.B.
Gown. Black stuff.
Hood. Black stuff, lined and one inch border blue silk.

M.A.
Gown. Black silk.
Hood. Black silk, lined with crimson silk.

B.D.
Gown. Black silk.
Hood. Black silk, lined with glossy black silk.

D.D.
Gown. Black silk.
Hood. Scarlet cloth, lined with black silk.

B.C.L.
Gown. Black silk.
Hood. Blue silk, trimmed with white fur.

D.C.L.
Gown. Black silk.
Hood. Scarlet cloth, lined with crimson silk.

M.B.
Gown. Black silk.
Hood. Blue silk, trimmed with white fur.

M.D.
Gown. Black silk.
Hood. Scarlet cloth, lined with crimson silk.

Mus.B.
Gown. Black silk.
Hood. Blue silk, trimmed with white fur.

Mus.D.
Gown. Black silk.
Hood. White silk in brocade, lined with crimson silk.

Sc.D. and Litt.D.
Gown. Black silk.
Hood. Scarlet cloth, lined with gray silk.

Doctors of Divinity, Civil Law, Medicine, Science, and Letters are entitled to wear a scarlet cloth gown, faced and lined with the color of the lining of the hood of their respective faculties. Doctors of Music for full dress wear gown of white silk in brocade faced and lined with crimson silk.

UNIVERSITY OF CAMBRIDGE.

B.A.
Gown. Black stuff.
Hood. Black stuff, trimmed with white fur.

M.A.
Gown. Black silk.
Hood. Black silk, lined with white silk.

B.D.
Gown. Black silk.
Hood. Black silk, lined with black silk.

D.D.
Gown. Black silk.
Hood. Scarlet cloth, lined with pink silk.

LL.B.
Gown. Black silk.
Hood. Black silk, trimmed with white fur.

LL.M.
Gown. Black silk.
Hood. Black silk, lined with white fur.

LL.D.
Gown. Black silk.
Hood. Scarlet cloth, lined with pink silk.

M.B.
Gown. Black silk.
Hood. Black silk, trimmed with white fur.

M.D.
Gown. Black silk.
Hood. Scarlet cloth, trimmed with pink silk.

Mus.B.
Gown. Black silk.
Hood. Black stuff, trimmed with white fur.

Mus.D.
Gown. Black silk.
Hood. Red puce silk, lined with white silk.

Doctors of Divinity, Laws, Medicine and Music are entitled to wear scarlet gowns, faced and lined with the color of the lining of the hood of their respective faculties.

UNIVERSITY OF EDINBURGH.

M.A.
Gown. Black silk.
Hood. Black silk, lined with white silk.

B.D.
Gown. Black silk.
Hood. Black silk, lined with purple silk, bordered with fur.

D.D.
Gown. Black silk.
Hood. Black cloth, lined with purple silk.

LL.B.
Gown. Black silk.
Hood. Black silk, lined with blue silk, edged with white fur.

LL.D.
Gown. Black silk.
Hood. Black cloth, lined with blue silk.

M.B. and M.S.
Gown. Black silk.
Hood. Black silk, lined with crimson silk, edged with white fur.

M.D.
Gown. Black silk.
Hood. Black cloth, lined with crimson silk.

B.Sc.
Gown. Black silk.
Hood. Black silk, lined with lemon-yellow silk, edged with white fur.

D.Sc.
Gown. Black silk.
Hood. Black silk, lined with lemon-yellow silk.

Full dress gowns for doctors of the University of Edinburgh are made of superfine scarlet cloth, loose sleeves, lined with rich silk of the color of the lining of the hood of the graduate's degree.

MCGILL UNIVERSITY.

Undergraduates shall wear a plain black stuff gown, not falling below the knee, with round sleeve cut above elbow.

Bachelor of Arts.— Black stuff gown, falling below knee, with full sleeve cut to elbow and terminating in a point (similar to that of the Cambridge B.A.); hood, black silk, lined with pale blue silk and edged with white fur.

Bachelor of Science.— The same gown as Bachelor of Arts; hood, black silk, lined with yellow silk and edged with white fur.

Bachelor of Civil Law.— The same gown as Bachelors of Arts; hood, black silk, lined with French gray silk and edged with white fur.

Bachelor of Architecture.— The same gown as Bachelors of Arts; hood, black silk, lined with white silk and edged with white fur.

Bachelor of Music.—The same gown as Bachelors of Arts; hood, black silk, lined with pale mauve silk, and edged with white fur.

Master of Arts.— Black gown of stuff or silk, falling below knee, with long sleeve with semi-circular cut at the bottom (similar to that of the Cambridge M.A.); hood, black silk, lined with pale blue silk.

Master of Science.— The same gown as Masters of Arts; hood, black silk, lined with yellow silk.

Doctor of Medicine.— The same gown as Masters of Arts; hood, scarlet cloth, lined with dark blue silk.

Doctor in Dental Science.— The same gown as Masters of Arts; hood, scarlet cloth, lined with pink silk.

Doctor of Laws.— The same gown as Masters of Arts; hood, scarlet cloth, lined with white silk.

Doctor of Literature.— The same gown as Masters of Arts; hood, scarlet cloth, lined with pale blue silk.

Doctor of Science.— The same gown as Masters of Arts; hood, scarlet cloth, lined with yellow silk.

Doctor of Music.— The same gown as Masters of Arts; hood, scarlet cloth, lined with pale mauve silk.

Doctor of Philosophy.— The same gown as Masters of Arts; hood, scarlet cloth, lined with pale green silk.

Doctor of Civil Law.— The same gown as Masters of Arts; hood, scarlet cloth, lined with French gray silk.

Doctors of Laws, Doctors of Civil Law, Doctors of Literature, Doctors of Science, Doctors of Philosophy and Doctors of Music shall be entitled to wear for full dress a robe of scarlet cloth (similar in pattern to that of the Cambridge LL.D.) faced with silk of the same color as the lining of their respective hoods.

All hoods shall be in pattern similar to that of the Masters of Arts of Cambridge University.

Undergraduates and graduates shall wear the ordinary black trencher with black tassel, but Doctors of Laws, Doctors of Civil Law, Doctors of Literature, Doctors of Science, Doctors of Philosophy and Doctors of Music shall wear for full dress a black velvet hat with gold cord, similar to that worn by Doctors of Laws of Cambridge University.

The idea of a well-defined system for the American colleges and universities arose about 1893 after there had become evident a decided movement toward the use of academic costume by senior classes, trustees and faculties outside of the institutions named in the opening paragraph of this article. The College of Bryn Mawr opened with caps, gowns and hoods for faculty and students in 1885, the faculty of Harvard had equipped for her 250th anniversary in 1886, the trustees of Yale about the same time, the seniors of Williams in 1883, the seniors of Wellesley for Tree Day in 1884, the Yale, Union and Amherst seniors in 1891, seniors of Harvard, Dartmouth, University of Syracuse and several others in 1892, the faculties of Brown and The University of Chicago, seniors of the University of Vermont, Dickinson, Wesleyan, Tufts, Hampden-Sidney, Wells, Lafayette, Mount Holyoke, Elmira, Colby and many others in 1893. The movement was essentially a student movement to provide a senior badge and to improve the commencement week exercises, take the place of the archaic "dress suit" or "swallow-tail" and revive the traditions of a continuing and related university life. It was approved particularly by the

[illegible]

Bachelor's Cap, Gown and Hood

Doctor's Cap and Gown

Master's Cap, Gown [illegible]

[illegible] the field of [illegible] set or fields [illegible]

[illegible] the [illegible] New York [illegible] versity [illegible] members [illegible] this [illegible] He pro[illegible] experi[illegible] problem [illegible] in a [illegible]

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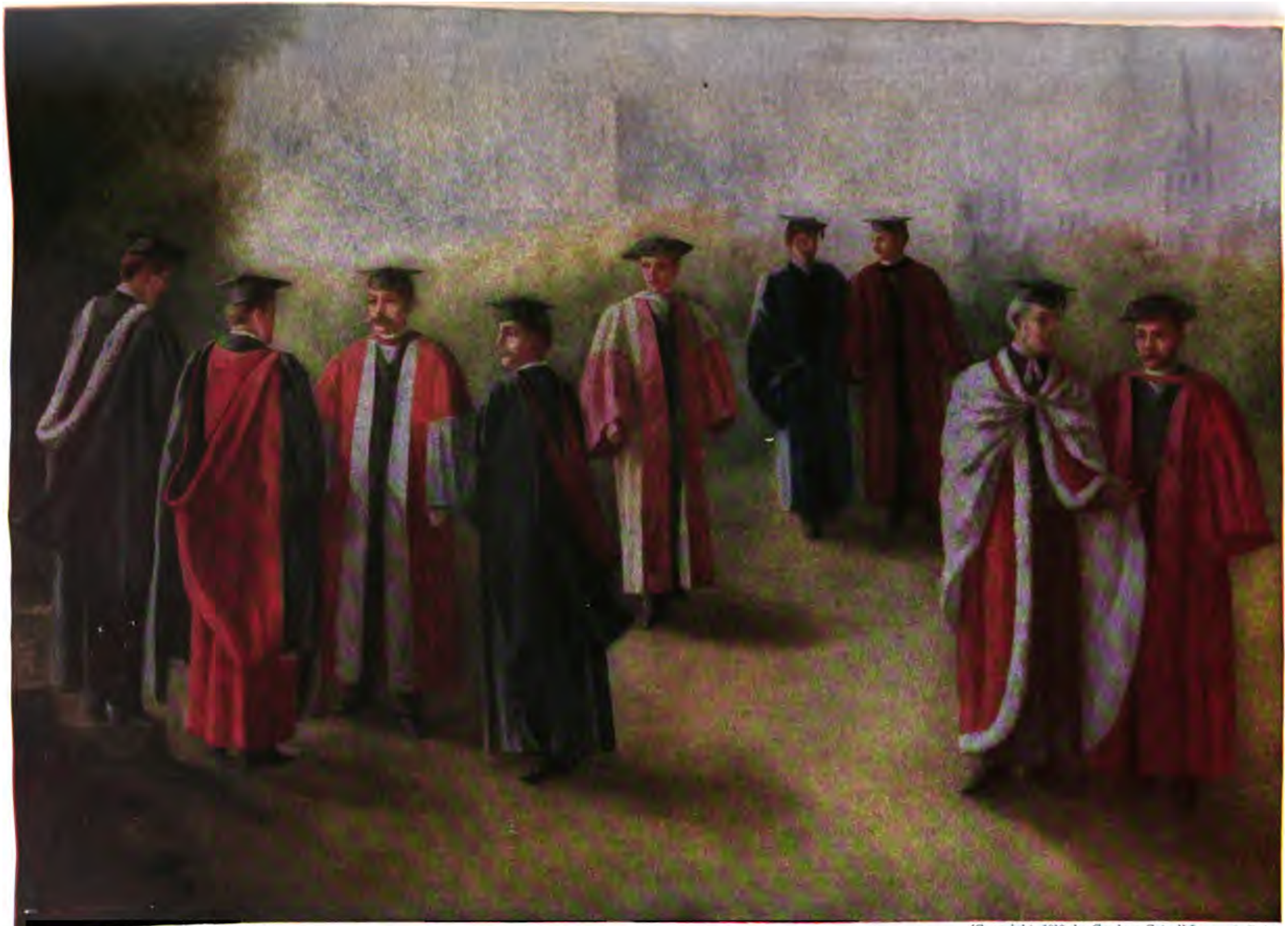

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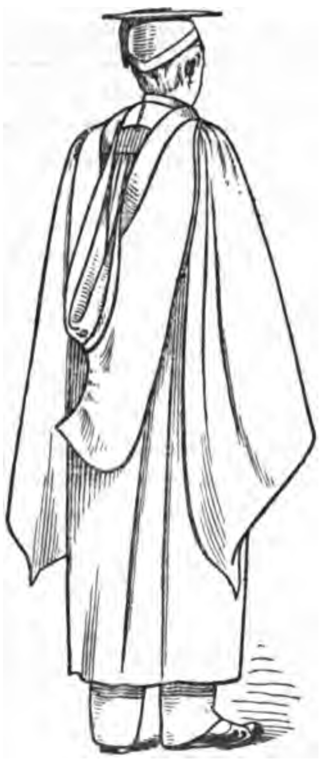
BRITISH USUAGE IN ACADEMIC COSTUME.

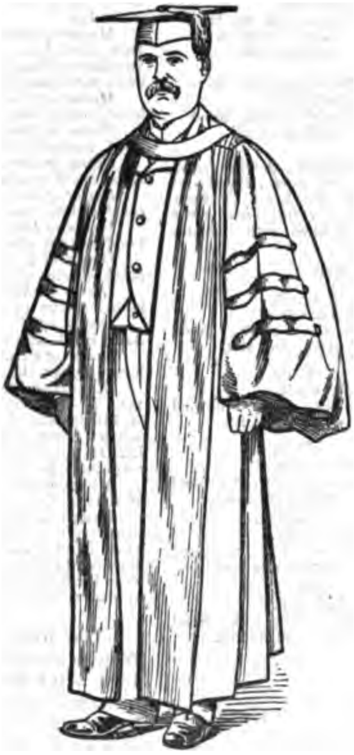
B.A., Oxford
D.D., Oxford (Convocation Robe).
Sc.D., Oxford. (Full Dress).
M.A., Oxford
Mus.D., Oxford.
Pensioner Trinity College, Cambridge.
D.D., Edinburgh Full Dress.
Vice-Chancellor, Cambridge.
D.C.L., Oxford (Full Dress)

students on account of its being uniform which overcame all differences of dress and made for democracy. It was seen that the gowns aided grace and overcame awkwardness in speaking and that the general effect was to make university functions more characteristic, interesting and impressive to all beholders. It was discovered that on account of the improved appearance of all wearing academic costume, and the increased interest aroused by the dignity of the ceremonies that there was better attendance on the part of trustees, faculties, alumni, students and friends of the colleges and universities.

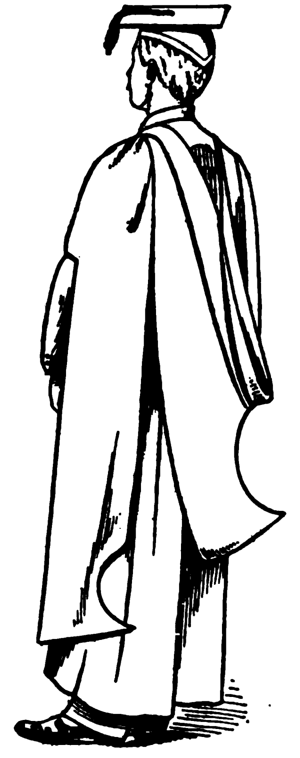
Realizing that there must be an intelligible system adaptable to all institutions if the many American colleges were ever to enjoy the full advantages of academic costume, an intercollegiate commission was formed in 1893 and there was prepared a tentative draft of a uniform code for caps, gowns and hoods for the various degrees, designed so as to show in the hoods also the sources of the degrees by use of the college colors. Col. John J. McCook of the Princeton trustees, President Seth Low and Bishop Potter of the Columbia trustees, Rev. Charles Ray Palmer of the Yale trustees and Chancellor MacCracken of New York University were the most active members of this commission, and the writer of this article was called in as a technical adviser. He prepared colored sketches; made up experimental hoods and gowns; and solved the problem of satisfactorily combining two colors in a hood lining by the adaptation of the heraldic chevron as in the linings of the hoods of Princeton, Columbia, University of Pennsylvania, Johns Hopkins, Cornell, University of California, University of Illinois, University of Michigan, Northwestern, University of Pittsburgh, Tulane and many others. In order to make variations in combining the same two colors when used by various institutions, one color is used as the field and the second as the chevron; another institution reverses by using the second color as the field and the first as the chevron. Then one is used above the other in the hood lining, the dividing line being on the line of a chevron (parti-per-chevron). Sometimes two or three chevrons of the first color are set on the field of the second color and then two or three chevrons of the second color on the field of the first color. A few zones are set on fields of other colors.



Bachelor's Cap, Gown and Hood.



Doctor's Cap and Gown.



Master's Cap, Gown and Hood.

The Intercollegiate system makes the following distinctions in the gowns, hoods and caps.

GOWNS.

Undergraduate.— Of black stuff, open or closed in front, round or pointed sleeve.

Bachelors.— Of black stuff, open or closed in front, long pointed sleeve.

Masters.— Of silk preferably, open front, long closed sleeve with slit in upper part for arm.

Doctors.— Of silk preferably, open front, round bell sleeve; faced down the fronts and barred on the sleeves with black velvet or velvet wholly or in part of the color designated for the trimming of the hood for the doctorate held.

Presidents, Chancellors and Deans may wear the gowns trimmed with gold braid and may wear other marks of office not inconsistent with the Code.

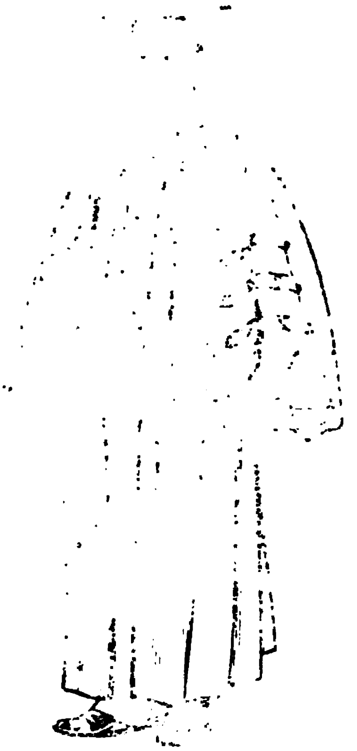
Members of the Governing Body (Trustees, etc.) may wear the doctor's gown during tenure of office.

Photo by Marcus L. McMicken, Albany, N. Y.

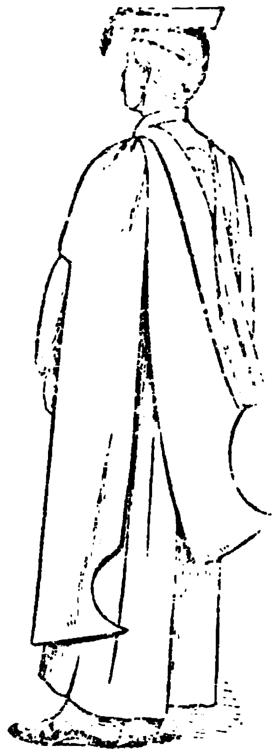
B. A., Oxford   D. D., Oxon. [illegible]
(Convocation Robes [illegible])

[illegible] of Princeton [illegible] Pennsylvania, [illegible] University of California, [illegible] University of Michigan, [illegible] University of Illinois. [illegible] In order to make [illegible] two colors when used [illegible], one color is used as [illegible] as the chevron; and [illegible] using the second [illegible] as the chevron. [illegible] the old [illegible] in the hood [illegible] on the line of a chevron). Sometimes two or three [illegible] are set on the field [illegible] then two or three [illegible]

[illegible] Cap, Gown and Hood.



Doctor's [illegible] Gown.



Master's Cap, Gown and Hood

[illegible] ter to [illegible] costume [illegible] form [illegible] representative [illegible] Yale [illegible] New York [illegible] ers [illegible] article [illegible] pres [illegible] problem [illegible]

[illegible] the second color on the field of the first color. A few [illegible] are set on fields of other colors.

The [illegible] system makes the following [illegible] the gowns, hoods and caps.

[illegible] GOWNS.

[illegible] stuff, open or closed in front [illegible]

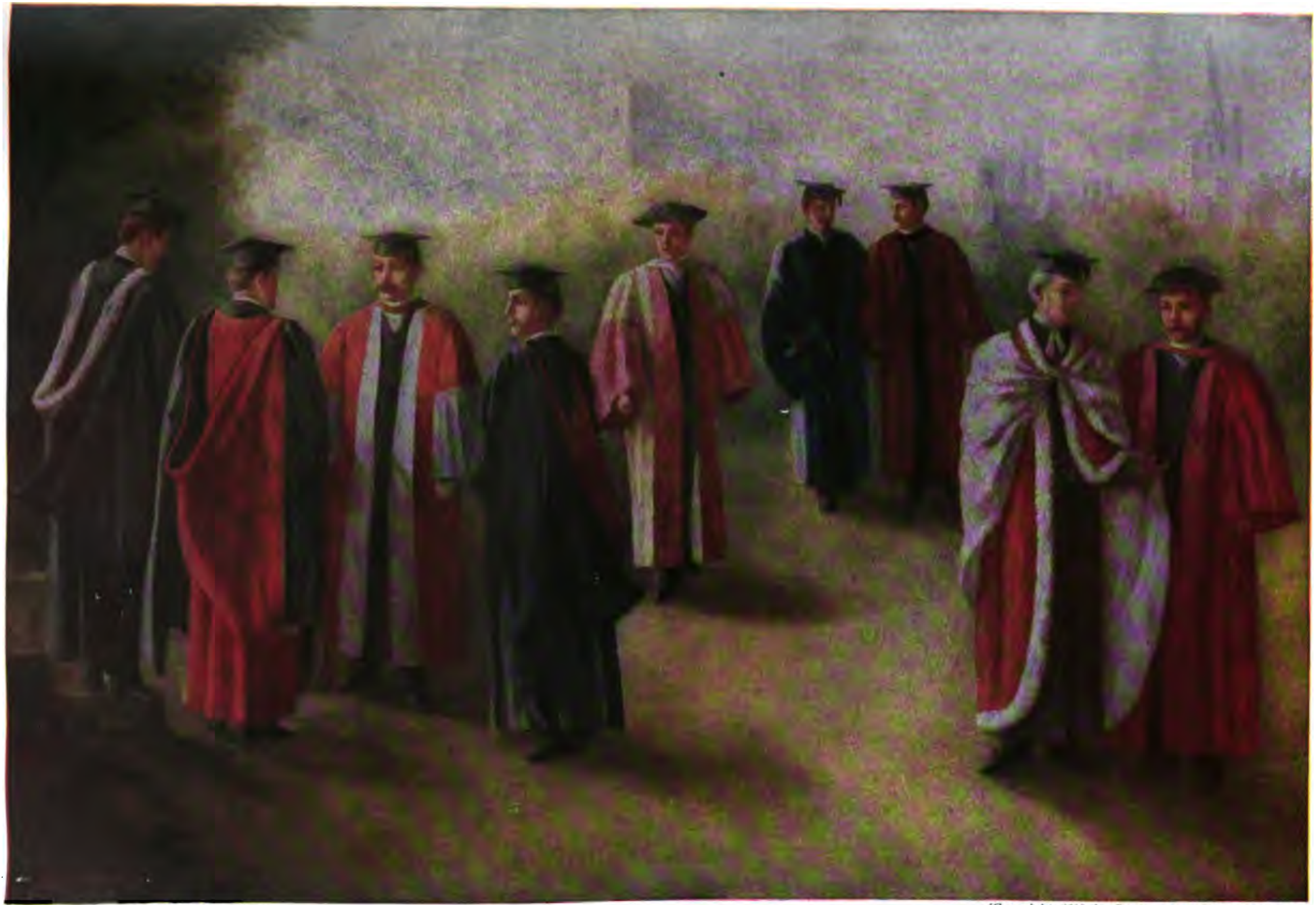
[illegible] open or closed in front, [illegible]

[illegible] open front [illegible]

[illegible] open front, [illegible]

[illegible]

[illegible] Doctors, [illegible] may wear [illegible]



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BRITISH USUAGE IN ACADEMIC COSTUME.

B.A., Oxford D.D., Oxford (Convocation Robe). Sc.D., Oxford. (Full Dress). M.A., Oxford Mus.D., Oxford. Pensioner Trinity College, Cambridge. D.D., Edinburgh Full Dress. Vice-Chancellor, Cambridge. D.C.L., Oxford (Full Dress)

HOODS.

Hoods should be of material similar to the gowns, are of distinctive shapes or lengths for Bachelor, Master or Doctor; are lined with silk showing the official colors of the institution that conferred the degree or with which the wearer is connected and are trimmed in proper widths with velvet distinctive of the degrees as follows:

Arts and Letters	White
Theology and Divinity	Scarlet
Laws	Purple
Philosophy	Blue
Science	Gold yellow
Fine Arts	Brown
Medicine	Green
Music	Pink
Pharmacy	Olive
Dentistry	Lilac
Forestry	Russet
Engineering	Orange
Veterinary science	Gray
Library science	Lemon
Pedagogy	Light blue
Commerce and Accountancy	Drab
Physical education	Sage green
Humanics	Crimson
Oratory	Silver gray
Public health	Salmon pink
Agriculture	Maize
Economics	Copper

CAPS.

The Oxford cap, of stuff or broadcloth, is worn for all degrees, but the doctorate is entitled to a tassel of gold or part gold and the doctor's cap may be of velvet.

Official Colors.— The official colors for the hood linings of some of the leading institutions of the United States are as follows:

Allegheny	Navy blue, old gold chevron
Amherst	Purple, white chevron
Boston	Scarlet, white chevron
Bowdoin	White
Brown	Brown
Bryn Mawr	Maise, white chevron
Carnegie Institute of Technology	Carnegie Tartan
Catholic University	Papal yellow, white zone
Colgate	Maroon
College of the City of New York	Lavender
Colorado College	Black, old gold chevron
Columbia	Light blue, white chevron
Cornell	Cornelian, two white chevrons
Dartmouth	Green
DePauw	Old gold
Drake	White, azure chevron
Fordham	Maroon
Georgetown	Gray, blue chevron
George Washington	Dark blue, buff chevron
Georgia School of Technology	Old gold, white chevron
Goucher	Dark blue, gold yellow chevron
Hamilton	Blue, buff chevron
Harvard	Crimson
Holy Cross	Purple
Hunter	Lavender, white chevron
Indiana	White, red chevron
James Millikin	Presbyterian blue, white chevron
Johns Hopkins	Black, gold chevron
Lafayette	Maroon, white chevron
Leland Stanford Jr	Cardinal
Louisiana State	Purple above old gold, parti-per-chevron
Massachusetts Institute of Technology,	Bright red, silver-gray chevron
Miami	Bright red, white chevron
Mount Holyoke	Light blue
New York	Violet
Northwestern	Purple, gold yellow chevron
Oberlin	Red, gold yellow chevron
Ohio State	Scarlet, silver gray chevron
Pennsylvania State College	Navy blue, white chevron
Princeton	Orange, black chevron
Purdue	Black, two old gold chevrons
Radcliffe	Crimson, white chevron
Rensselaer Polytechnic Institute	White, bright red chevron
Rutgers	Scarlet
Simmons	Dark blue, gold chevron
Smith	White, gold chevron
State College for Teachers (Albany, N. Y.),	Purple, wide gold yellow chevron
Saint Lawrence	Bright red, dark brown chevron
Saint Louis	White, wide blue chevron
Stevens Institute of Technology	Gray, scarlet chevron
Syracuse	Orange
Temple	White, cherry red chevron
Tufts	Brown, light blue chevron
Tulane	Olive green, light blue chevron
Union	Garnet
University of Alabama	Oxford crimson, white chevron
University of California	Gold, blue chevron
University of Chicago	Maroon
University of Cincinnati	Bright red, two black chevrons
University of Illinois	Navy blue, two orange chevrons
University of Kansas	Dark blue, red chevron
University of Kentucky	White above blue, parti-per-chevron
University of Maine	Light blue
University of Michigan	Maize, azure blue chevron
University of Minnesota	Old gold, maroon chevron
University of Missouri	Old gold, two black chevrons
University of Nebraska,	Scarlet above cream-white, parti-per-chevron
University of North Carolina	Light blue, two white chevrons
University of Oklahoma	Cream, crimson chevron
University of Oregon	Lemon yellow, dark green chevron
University of Pennsylvania	Red, blue chevron
University of Pittsburgh	Navy blue, gold-yellow chevron
University of Rochester	Dandelion-yellow
University of Southern California	Gold yellow
University of Tennessee	White, orange chevron
University of Texas	White above orange, parti-per-chevron
University of Virginia	Navy blue, orange chevron
University of Washington,	Purple above gold, parti-per-chevron
University of Wisconsin	Cardinal
Vassar	Rose, gray chevron
Washington (Saint Louis, Mo.)	Myrtle green, red chevron
Wellesley	Dark blue
Wesleyan	Cardinal, wide black chevron
Western Reserve	White, scarlet chevron
West Virginia	Old gold above dark blue, parti-per-chevron
Wheaton (Mass.),	White above blue, parti-per-chevron, reversed
Whitman	Blue, maize chevron
Williams	Royal purple
Winthrop	Garnet, gold chevron
Wooster (College of)	Old gold, black chevron
Yale	Blue

The commission offered its code to all higher institutions of learning and it was soon officially adopted by the leading universities and colleges and generally understood to be in effect throughout the country. The Intercollegiate Bureau of Academic Costume was established at Albany, N. Y., and did the work of registering the official colors in their official arrangements as the various institutions adopted them. It has required much labor to keep distinct the hood linings of more than 700 institutions that use the Intercollegiate System in the United States, Philippines, Porto Rico, Turkey, Syria and Canada. Degrees from French, German and Swiss universities held by residents of America are also shown by characteristic linings duly registered after suitable official action. Correct and differing shades of the same colors have to be registered and gown makers are confronted with the problem of keeping the colors the same through the passing years which can only be done by having considerable quantities woven to order of each color, as recorded by the Intercollegiate Bureau at Albany, N. Y. This bureau is working under a charter granted in 1902 by the Regents of the University of the State of New York and has for its object "to establish and maintain a library relating to the universities, professional, technical and advanced schools and colleges of the world, particularly as to their membership and their ceremonial and other public appearances, including their gowns, hoods, caps, robes, badges, banners, arms and other regalia used on such occasions; to maintain a register of statutes, codes and usages, designs and descriptions of the articles of academic costume and regalia with their correct colors, materials, qualities, sizes, proportions and the arrangement thereof; to promote social intercourse among members of universities and colleges and to disseminate information on the subjects above mentioned.»

The bureau aims to keep from confusion the distinctive details of symbolic academic costume and to aid without charge all institutions with any information in its possession. It invites correspondence.

The use of hoods by graduating classes has been increasing in recent years and candidates who are known as eligible, often don the hoods for the baccalaureate sermon or at a special ceremony at the beginning of commencement week known as «Hi Juvenes» when the names of those who have passed the final examinations are read off. The hoods, with their æsthetic brightening of the otherwise rather sombre costumes and their appeal to college spirit by the display of the college colors, thus yield their significance during the full period of commencement time.

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GARDNER COTRELL LEONARD,
Director of Intercollegiate Bureau of Academic Costume.

COSTUME, Ecclesiastical. Hebrew.— The vestments of the Levitical priesthood briefly enumerated were as follows: (1) *Drawers* or «breeches» of linen. (2) *Tunic* of linen concerning which Josephus informs us that it reached to the feet, fitted close to the body and was furnished with tight sleeves. It was girded to the breast, a little above the level of the elbow. (3) *Girdle.* A strip of linen four fingers broad, Josephus says, but, according to Maimonides, three fingers broad by 32 cubits in length. This was wound several times round the body, the ends tied over the breast, leaving the extremities hanging down to the feet; in officiating over a sacrifice or other ceremony the priest threw it over his shoulder to afford more freedom of action. Elaborate embroidered decoration was done in scarlet, purple and blue threads in the form of flower motifs. (4) *Priest's Cap.* This was of turban form which Josephus describes as «a cap, not brought to a conic form nor encircling the whole head but still covering more than half of it, and is termed *mesnaemphthes.*» These are all of the sacerdotal vestments, according to Mosaic law, of the Jewish priest. The high-priest's vestments now follow: (5) The «robe of the ephod» consisting of a blue tunic that reached to the feet, according to some authorities, but only to the knees, according to others. This was woven in a single piece having an aperture for inserting the head. Golden bells and pomegranate motifs were suspended from the hem alternately. (6) *The Ephod.* This was the most important part of the high-priest's equipment. The Book of Exodus tells us it was of gold, blue, purple and scarlet; Josephus says it «was woven to the depth of a cubit of several colors, and it also had sleeves, nor did it appear to be made at all differently from a short coat.» It appears probable that this vestment was composed of two pieces, Macalister says, front and back buttoned together with two onyx stones, one on each shoulder, set in bezels or «ouches» and engraved with the names of the 12 tribes, six on one and six on the other. Round the waist was passed a girdle which was made of materials similar to the ephod and embroidered elaborately with colored threads. (7) *The Breast Plate.* This was a rectangular piece of cloth the same as the ephod and folded to make a perfect square of about nine inches on each side. Twelve stones were fixed in this in gold settings, arranged in four rows of three each. Each had the name of one of the tribes engraved on it. The stones are said to have been carnelian, peridot, emerald, ruby, lapis-lazuli, onyx, sapphire, banded agate, amethyst, topaz, beryl and jasper. This was attached to the ephod by two plaited or twisted gold chains or rods which fastened to the bezels on the shoulders of the ephod and whose other ends were attached to gold rings on the two upper corners of the breast-plate and below by two cords or ribbons passing from two rings in the lower corners to the sides of the ephod above the embroidered girdle. (8) *The Mitre.* The high-priest's mitre appears to have differed from the headdress of the priest only in having a gold plate set in blue lace and in having the inscription «Holy to Jehovah.»

Vestments of the Roman Church.— The vestments worn by the priests of the Western Church at the Eucharistic ceremony (sometimes termed «sacred vestments») during the papacy of Innocent III (about 1200) were alb, girdle, amice, stole, maniple, dalmatic, chasuble, sandals, pall, stockings, subcingulum, mitre, gloves, ring, staff, tunicle, orale. The «rational» was in use in the 12th century. In ecclesiology the term *vestments* has, at times, included church furniture in old inventories of the Church. (1) *Alb.* A long gown usually of linen but frequently of silk, or cloth of gold is mentioned sometimes, or even velvet. As its name implies, it was originally white but is often red, blue or black. Early in the 11th century the alb had a round gold plate just above the lower hem on either side as an ornament; sometimes in the same period we find rows of small gold plates ranged round the lower edge; these are, respectively, the *albæ sigillatæ* and *albæ bullatæ.* Ordinarily, especially in later years, the ornamentation is embroidery in small patches, termed *apparels,* sewn on various parts of the vestment. Such were located as follows: Two rectangular ones just above the lower hem, one in front, one behind; another on the back and one on the breast; a small patch was on each cuff and a narrow strip bordering the orifice for the head. Early examples show two narrow strips running down the front and the back. Early cuff-apparels encircled the entire wrist to become, later, small patches appearing above the back of the hand. Albs have to be worn plain at times (on Good Friday, for instance). The alb used to be made so long as to need drawing in and hanging over the girdle. (2) *Girdle.* This secures the alb and is a narrow band (called also *cingulum*), usually of cotton with a tassel at each end. Some bore colored embroidery. The girdle is about four yards long. As the alb is drawn in and over the girdle the latter is not seen in mediæval monuments. (3) *The Amice;* called also *humerale* and *anamoladium.* This was a creation of the Middle Ages and intended at first to act as hood; it is still so worn in some places in France from All Saints Day till Easter. It is the first vestment to be put on. The amice was rectangular (36 inches by 25) and has strings at each end long enough to go round the body and cross over the breast. Embroidery (*orphreys*) ran along one of the long sides. In its position around the neck it is worn like a collar above the other vestments, but leaving the throat uncovered. In the middle of the upper edge is a small cross. The amice was made of linen. (4) *The Stole.* Spelled also *stola.* This is a narrow strip, 9 or 10 inches long, of embroidered work two or three inches wide. It was at first of even width from one extremity to the other but, about the 13th or 14th century, it assumed a wider square panel at each end in which crosses and other decorations were embroidered. This immediate change in width is modified in modern stoles by a gradual increase. The stole is worn between the alb and chasuble, crossing over the breast and secured there by the alb girdle, but at present only during mass officiation. Deacons wear the stole over the left shoulder and under the right arm; bishops wear it between the alb and tunicle hanging down on either side of the breast. In ancient times the stole was made so long as to reach almost to the feet, thus showing both ends below the chasuble of the priest or the still lower dalmatic of the bishop. It was of intensely rich decoration, sometimes made of gold thread with very little silk. In Anglo-Saxon days little silver bells, apparently, were attached to the extremities of the stole. (5) *The Maniple.* This vestment is of similar form to the stole and was worn, at first over the fingers of the left hand, later, for convenience, it was suspended from the left wrist, in which latter case it is often buttoned or sewn on to avoid its slipping off. Its length varies from three feet to three feet three inches and its width is about three inches. (6) *The Dalmatic.* This appears to have originated about the 9th century. It is split open a short distance on both sides and the slits decorated with fringe (the deacon's dalmatic is fringed only on the left side). Perpendicular bands or horizontal orphreys ornament the dalmatic, which was white up to the 12th century, then the entire vestment became elaborately embroidered. (7) *The Chasuble.* The last vestment to be put on before celebrating mass. It was made from different materials, velvet, silk or cloth of gold, most frequently. For a time in the early mediæval period a hood was sewn to the ordinary chasuble when used in processions, but it soon was displaced by the cope. The early chasuble was constructed of a semi-circular piece of cloth with a notch for the neck cut out in the centre. The two straight edges were then sewn together producing a vestment of truncated cone form. This form created an impediment to upward movement of the arms of an officiating priest, so it was made of an oval piece and an open space cut in the centre for the head, this left the length of the vestment in front and behind with the short sides covering the upper parts of the arms. In modern Roman chasubles we find rather large semi-circular portions cut out from the front sides, thus allowing the hands to be brought together without disarranging the draping of the vestment. At times we find another form appearing in the Middle Ages being cut elliptical and pointed at the extremities, the "vesica piscis" shape, leaving the front and back ends in blunt points. Decoration of the chasuble varies. Some were plain (earlier examples always), others had embroidered (*orphrey*) ornament consisting of strips which were sewn on the edge or crosswise on front and back. The less elaborate (edge) decoration is found mostly on parish priests' vestments, while the extensive front and back embroidery is found more on the monuments of bishops, abbots and other richer dignitaries. The Latin cross is often on early chasubles back and front, and the modern vestment retains it on the back. The chasuble surmounts all other vestments. (8) *The Sandals.* The Roman sandal consisted of a sole secured to the foot by leather thongs. Some monastic orders retain this form, but the colder Northern regions necessitated a change for better foot protection. In order to maintain the tradition in the Northern churches "fenestration" or open-work patterns were cut into the upper of a shoe, displaying the bare surface of the foot. These pseudo-sandals disappeared in the 14th century, giving way to shoes reaching above the ankles and the "fenestration" was represented by lavish embroidery with jewel and gold spangle decoration. (9) *The Pall.* Spelled also *pallium.* This vestment signifies jurisdiction and belongs to the vestments of the Pope. By him it is granted to patriarch primates and metropolitans, also at times as a mark of honor to bishops. "The pallium is woven of white wool, encircling the upper part the shoulders, and having the bands hanging down before and behind. It is double on the left side and single on the right. It has four purple crosses, to wit, in the front, and at the back, and at the two sides. It is fastened with three golden pins." (*Durandi Rationale*). This was the early mediæval form, the shoulder yoke being at right angles with the perpendicular arms and forming a T (or tau cross); later the loop droops in front and rear forming a Y. The plain early palls were fastened by pins, but with the richly ornamented chasuble loops had to be provided; later the pall has been left unsecured. The tails of palls vary as to length, being from the 11th to 14th centuries very long, then being shortened more and more, till at present only a little over a foot long. A small lead button is sewn into the tails to keep them from riding up. Earliest illustrations of palls show a single cross at each tail end; modern palls boast of no less than three crosses on each tail, four on the shoulder band, worked in black. (10) *The Stockings.* Called often *buskins.* These were, apparently, at first a papal vestment solely, as the bishops wore sandals. The episcopal wardrobe included, however, the *caligæ* by the time of Ivo of Chartres. From a condition of simplicity they took on enrichments in the Middle Ages.

(11) *The Subcingulum.* This vestment has become almost obsolete. It is a purtenance of the Pope exclusively and is formed like a girdle, passes round the alb and having on the left side a maniple-like appendage. This would appear to have been the 14th century form. (12) *The Rational.* This has also become almost obsolete but was worn early in the Middle Ages by the bishops in imitation of the Jewish high-priest's breast-plate. It was a wooden brooch covered with enameled metal and fastened on the breast of the chasuble. Few are mentioned in the inventories of cathedrals and we have little description concerning their form, which varied and was probably similar to the usual *morse.* It seems to have disappeared before the 15th century. (13) *The Mitre.* A covering for the head on solemn ceremonies by cardinals, bishops and the abbots of some monasteries by special privilege, also by the canons of certain churches. A characteristic of the mitre is its upper section dividing itself into two peaks; but illustrations of the 13th century would lead us to suppose that the bishop's headdress was closed above. The early double-pointed mitre was very low. In the 14th century it grew more pointed and enriched, then attaining its greatest perfection of form and decoration. The ornamentation grew to be most costly and elegant, the edges assumed crockets, the apex ended in a jeweled cross. From the end of the 15th century to the middle of the 18th century mitres kept growing higher and wider. There are three kinds or qualities of mitres, viz.: (1) The *Simplex;* (2) the *Aurifrigiata;* (3) the *Pretiosa.* Woodward thus defines them: "The *Simplex* is made of plain white linen, or white silk damask, with red fillets (*infulæ*). The *orphreyed mitre, mitra aurifrigiata,* is composed of silk damask, or cloth of silver or gold, but without plates of metal or any jewels except seed pearls. The *precious mitre, mitra pretiosa,* is adorned with jewels (properly uncut) and the precious metals." Dr. Rock says of the mitre: "Except when made from hard gold beaten into thin plates, or of cloth of gold, its color was invariably white, and all the old mitres known still in existence have a white ground." Early Italian painters depicted mitres in colors, chiefly red and crimson. Lee says "the plain mitre (or *Simplex*) is used for processions." He states that the Church used the *pretiosa* mitre over a century after the Reformation; "it was so in the American Church, at all events, for Bishop Seabury's mitre is still (1877) preserved in the library of Trinity College, New York." Two pendants, termed *infulæ,* hang down from the back of the mitre, terminating usually in a gold fringe. (14) *The Episcopal Gloves;* called also *chirothecæ* and *manicæ.* These do not get special mention till the time of Honorius of Autun. They were jeweled and richly embroidered, sometimes studded with pearls, in the Middle Ages, and frequently a large stone was set in the back. Cahier says: "It was customary that the gloves destined for ecclesiastical ceremonies had to be made without seams (sewing) which necessitated knitting." Some authorities say they were made of silk or linen. (15) *The Episcopal Ring.* This is but one of a number of rings worn formerly by bishops; it was worn on the third finger of the right hand *above* the second joint and was usually held in that position by a plain guard ring. The ring consists of a circlet and precious stone set *en cabochon* (*carbuncle*), never cut; and the circlet was large enough to pass over the gloved finger. A sapphire was considered most appropriate but the emerald or the ruby figured often in episcopal rings. (16) *The Pastoral Staff.* Termed sometimes *baculus.* A badge of episcopal dignity since early in the Middle Ages. It had the form of a crutch (the *tau* or cross *potent,* T, of heraldry) till the 12th century, when it assumed the shepherd's crook form in the Western Church; the Greek Church retains the tau form in its *pateressa* to this day. Since the volute end appeared it has assumed many forms and its decoration has changed with the periods and styles. A favored form in early days was the *serpent* staff, the termination of the volute taking the shape of a serpent's head; frequently also dragon forms appear; the loop often encloses the Lamb. Immediately beneath the crook is a protruding member often of knob form — it is frequently called a *knop* — evidently intended to afford a better grasp on the staff. In the Gothic period these knops often take on beautiful architectural forms (*tabernacles*) of intricate carved work in lantern shape. While the Greek staff is short and only reaches to the hand (as symbolic of support), the Roman staff ranges from five to seven feet long. A cloth or scarf is attached to the shaft of the staff, apparently for the purpose of keeping the hand's moisture from tarnishing it. It is variously termed *orarium, sudarium, infula,* etc. (17) *The Tunicle.* A small and short kind of dalmatic used by subdeacons and bishops. The first tunicles appear about 820; they are of wool or silk. Passing like other vestments from the plain to the enriched, the early plain tunicles soon gave way to embroidered ornament in a strip across the subdeacon's breast, then spreading out over the entire surface. (18) *The Orale.* This is now called the *fanon.* Dr. Rock thus describes it: "An oblong piece of white silk gauze of some length, striped across its width with narrow bars, alternately gold, blue and red. It is cast upon the head of the Pope like a hood and its two ends are wrapped, one over the right and the other over the left shoulder, and thus kept till the holy father is clad in the chasuble" (as described later in The Pope's Investiture), when the fanon is thrown back and made to hang smoothly and gracefully round the shoulders like a tippet or wide collar. (19) *The Pectoral Cross* (see CROSSES). This is a late introduction appearing first in the pages of Durandus and Innocent III (end of 12th century), and apparently then for the Pope's exclusive use. Dr. Rock finds a pectoral cross on an ordinary bishop in the 16th century.

Other Vestments.— Besides the so-called "sacred" vestments used at the ceremonies of the Holy Eucharist, as enumerated above, we have the following garments of the ecclesiastics: *Almuce.* Some writers declare the *almuce* or *amess* is separate from the *amice* (see above) and thus describe it: "An ecclesiastical garment covering the head and shoulders, worn by canons while chanting the office in choir in cold weather. It is often confounded with the amice. It was commonly of blue cloth lined with fur. When the fashion of wearing the cap or *biretta* came in the almuce assumed the shape more of a tippet or hood, the upper part being thrown back from the head and allowed to hang down. In England, before the Reformation the almuce was worn by parish priests (parsons) as well as by canons. *Biretta.* Spelled also *beretta.* A square cap having three or four projecting corners rising from the crown. A tassel or tuft appears in the centre where these corners come together. The priest wears it on approaching the altar to say mass, those officiating in the choir and others. The biretta of a cardinal is red; that of bishops is often purple; other clerics wear a blue one. Doctors of Divinity have the privilege of being allowed to wear a biretta, and in France, Germany and Spain it is worn generally by the clergy. *Calotte;* the clerical skull cap. *Camauro.* This is the cap belonging to the Pope and worn on extra-liturgical occasions. It is made up of red velvet and white fur. *Cassock.* Frequently called after the French term, *soutane.* It is the outer garment of every order of clergy and consists of a long coat reaching to the feet; the clerical *frock.* It is confined at the waist by a broad sash called the *ceinture* and has an upright collar. In the Roman Church priests wear a black cassock; bishops, purple; cardinals, scarlet; popes, white. In the English Church black is usual with all the clergy, but bishops sometimes wear violet. Cassocks are worn in the choirs as well as surplices. *Chimere.* The upper robe of a bishop. It is purple for Roman prelates, black for English clergy. The latter have added lawn sleeves. *Cope.* Called often by the Latin name, *cappa.* While the pallium and pluviale are termed cope by some writers, others say this is a choral, not Eucharistic, vestment. It is a large semi-circular cloak of silk or other material, stiff with gold and embroidered enrichment. In front it is held together by a morse or clasp, and is worn by the priest above the alb or surplice. The decoration (*orphreys*) consists of two broad bands from neck to bottom of the garment; a hood is behind, “originally designed to be drawn over the head in wet weather, . . . hence the term *pluviale.*” *Mantelletta.* A sleeveless vestment of silk or wool, open in front, but fastened, and reaching to near the knees. It has openings for the arms, and a wide collar round the neck. Cardinals, bishops, abbots wear it. It covers the *rochet,* so that bishops do not wear it except outside their dioceses, the rochet uncovered being a sign of jurisdiction. Cardinals' mantellettas are in three colors (red, violet and rose), that of the bishop of one color. *Mozetta.* This is a papal garment but worn, with the Pope's privilege, by cardinals, bishops, abbots, etc.; it is worn by English canons. It is a short vestment open in front (but may be buttoned over the breast) and covers the shoulders; it has a small hood behind. Painters generally depict bishops wearing the mozetta as it is part of their state costume when not officiating in sacred ceremonies. As the mozetta exposes the rochet, cardinals, bishops and other dignitaries do not wear it outside their jurisdiction unless it is over the mantelletta. The Pope has no less than five different mozettas. Of red satin during the heated season, except on vigils, ember days, masses of the dead and other penitential ceremonies, then it is of red serge or camlet. The rest of the year he wears a red velvet mozetta, except on penitential or sorrowful occasions, as Advent, Septuagesima, Lent, Vigils, etc., when his mozetta is of red woolen cloth. His mozetta from Holy Saturday to Sunday in Low Week is of white damask. Four mozettas belong to the cardinals; red or purple silk, violet silk, rose-colored silk, violet serge. *Rochet.* A linen or lawn vestment, similar to the surplice but sleeveless or of less ample sleeves, worn by bishops, abbots and at times by canons. It reaches only to the knees. The uncovered rochet is sign of jurisdiction. English bishops wear the rochet beneath the chimere. *Scapular.* The hood and cloak of the monastic orders. This term is also used by the Catholic Church to designate two small pieces of cloth worn over the shoulders under the ordinary garb, connected by cords and reaching almost to the feet. The scapular of the Holy Trinity is of linen with a red and blue cross; the scapular of the Servites is of black woolen material; that of the Immaculate Conception of light blue cloth; that of the Passion in red. *Surplice.* A long, loose vestment worn over the cassock in choir and in the administration of the Sacrament. It is one of the most modern of ecclesiastical garments, and is composed of white linen with wide sleeves. Pugin calls it an enlarged alb. The surplice is sometimes termed *cotta,* but others term the sleeveless or short-sleeved short surplice a *cotta.* The Greek Church has a vestment termed *omophorion* which consists of a long woolen band enriched with embroidered crosses.

Papal Vestments.— In the ceremonies of the Pope's investiture he wears the *tiara* or triple-crowned head-piece. Up to the time of Boniface VIII (end of 13th century) the Pope was decorated with a single crown; he added a second crown. Benedict XII (about 1334) added the third crown. The three crowns have been claimed to refer to the Trinity, also to his power over Heaven, earth and purgatory; others affirm they denote temporal power over the Roman states, spiritual power over the souls of men, and ruler over the kings and potentates of Christendom. It has been termed *regum, paplis mitra, phrygium,* etc. The cap is of thin metal or cloth of gold and silver, the crowns are of foliated gold adorned with pearls, and sometimes set with jewels. It is only worn on the most solemn ceremonies. Above an alb of fine linen, of which the lower border is decorated with narrow lace, the Pope wears a stole embroidered with gold. An ample mantle covers the pontiff's body; it is termed a *pluviale,* fastened in front by a magnificent clasp (*agrafe*) enriched with pearls. The pearls are arranged in a triangle, while in the *formale* (mentioned above) of the cardinals they are in a perpendicular line. It is a souvenir of the *rational* (breastplate) of the Jewish high priest. In celebrating mass the Pope never wears the tiara but a mitre, the same as that of a bishop. But what is termed the *mitra pretiosa* differs from that of a bishop in being decorated in front with a plate of gold, reminder of the mitre of the high priest of Mosaic law. Besides a white *soutane* (cassock) and *rochet* (see above) the Pope is clothed with an *amice* and an *alb* drawn in at the loins. The cardinal-deacon now hands him the pectoral cross, enriched with sapphires, and the fanon, which later covers the shoulders and part of the breast. The stole, of which the two ends hang down, is then covered over by the sub-diaconal tunic. The pontiff is lastly dressed in a chasuble on which the fanon is lowered, and on this last is placed a pall. In reception, in his apartment, when not giving audience, the Pope is clothed in a white cassock (this white cassock has been worn by the popes since early centuries). The shoulders are covered with a *soprana* or kind of cape with short sleeves, also of white. The pectoral cross never appears. In the indoor costume the Pope wears a hat of red silk bordered with gold. Generally, he wears a *rochet* of lace over which is a red *mozetta*, bordered with ermine, and a stole. On the vigil of Quasimodo the head of the Pope is covered with a white *calotte* (skull cap). His footcovering of cloth has on its upper part a cross embroidered in gold. The Pope's ring is conferred in conclave and is adorned with a representation of Saint Peter fishing and the pontiff's sign manual. On the death of the Pope the ring is broken; his successor always receives a new ring.

Costume of the Monastic Orders.— The characteristics of the outer robes of the different orders of monks are as follows: Benedictines, all black. Branches of same: Camaldolites, black; Carthusians, white habit, sandaled feet; but wore long black cloak and hood out of boundaries; Vallombrosans, pale ash color or light gray habit; Cistercians and Trappists, white habit and cowl; Olivetans, white habit; Oratorians, black habit; Basilians, black habit. Branches of the Augustinians: Premonstratensions, habit brown or black, white cloak; Servites, habit black, leather girdle, and cape; Trinitarians, white habit with blue or red cross on breast; Briggitines, black habit; Order of Mercy, white habit. Mendicant Orders: Franciscans are generally bare-footed or sandaled, their habit, originally gray, changed (after two centuries) to dark brown with knotted cord around waist. Branches of Franciscans: Capuchins, dark brown habit with long pointed hood, termed *capuche;* Poor Clares (nuns), gray or brown habit and cord, black veil; Observants, gray habit and cord; Cordeliers, brown habit and cord; Minimes, brown habit, short scapulary with rounded ends and cord of Saint Francis. Dominican Order, white habit under long black cloak with hood. Carmelites, dark brown habit, long scapulary, white mantle — the Scalzi branch is barefooted. Jesuits, black habit, straight black cassock, square black cap (*biretta*). Paulists, black cassock and biretta.

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Clement W. Coumbe.

COSTUS, or **COSTUS ARABICUS**, an aromatic much esteemed by the ancients, is the dried root of *Aplotaxis auriculata,* a composite plant, and is not derived from the plant *Costus arabicus,* as was at one time supposed. It is a native of the moist open slopes surrounding the valley of Cashmere. The roots are there burned as incense. They have a strong, aromatic, pungent odor, and are employed in protecting bales of shawls from moths. It is also used in India as a hair wash, as a stimulant in cholera and as a stimulating ointment.

COT, kōt, **Pierre Auguste**, French painter: b. Bedarieux, 17 Feb. 1838; d. Paris, 18 Aug. 1883. He studied under Cogniet, Cabanel and Bouguereau. Among his works are ‹Spring Time› (Brooklyn Museum); ‹Prometheus›; ‹Moreille›; ‹The Swing›; and ‹The Storm,› often called ‹Paul and Virginia› (in the Metropolitan Museum, New York).

COTABATO, kō-tä-bä'tō, Philippines, a province in the southern part of the island of Mindanao; area, including dependent islands, 8,344 square miles. The chief river is the Grande River of Mindanao, known also as the Pulangui, the largest river of the Philippines. The province is the most fertile in the island, and rice, sugarcane, cotton, coffee, tobacco, corn and vegetables are raised for home consumption. The gutta-percha trade is quite large and is controlled by Chinese. The first United States military station was established in 1899, and in 1903 the province was placed under civil government. Pop. 4,150.

COTÉ, kō-tā', **Aureole Suzor**, Canadian artist: b. Arthabaska, Quebec province, 1870. He was educated at the Commercial Academy, Arthabaska, and as a youth was employed in Montreal in the decoration of the walls of churches and public buildings. He went to Paris in 1891, where he studied under Bonnat and Lefebvre, and won the grand prize for the competitive picture. ‹The Death of Archimedes› in 1898. He began exhibiting in the Salon in 1894. In 1907 he returned to Canada, and was commissioned by the Dominion government to execute panel decorations and illustrations for the Parliament buildings at Ottawa. ‹The Landing of Jacques Cartier in Canada› and ‹The Landing of Champlain at Quebec› are two of the best known of his historical pieces; his portrait of Sir Wilfrid Laurier in the Parliament buildings is a good example of his skill in portraiture; and in sculpture, his ‘Habitant Drawing Wood.’

CÔTE D'OR, kōt-dŏr, France, a department formed of part of the old province of Burgundy; area, 3,392 square miles. The surface is in general rather elevated and is traversed by a chain of hills forming the connecting link between the Cevennes and the Vosges. A great part of the department is covered with forests. The valleys and plains are fertile and there is good pasture land; but vine culture is by far the most important branch of industry. The wines of the department are celebrated. Côte d'Or is watered by the Seine, which rises in the northwest, and by several of its branches; by the Saone and by Arroux, a tributary of the Loire. The climate is temperate; iron, coal, marble, gypsum and lithographic stones are found, the first in large quantities. Côte d'Or is divided into four arrondissements, 36 cantons and 717 communes. Capital, Dijon. Pop. 350,044.

CÔTE-D'OR (hill, or hillside of gold), a chain of mountains in France which separates the basin of the Saône from the basins of the Seine and Loire, and connects the Cevennes with the Vosges. The name has special reference to a small chain in Burgundy, so called from the abundance of excellent wine which they yield. Their height varies from 1,400 to 1,800 feet. The chain runs from north-northeast to south-southwest and is about 150 miles long, beginning at the plateau of Langres and extending to the sources of the Bourbince and the Dheune.

COTES, kōts, **Roger,** English mathematician: b. Burbage, Leicestershire, 10 July 1682; d. Cambridge, England, 5 June 1716. He was educated at Trinity College, Cambridge, and in 1706 became first Plumian professor of astronomy and natural philosophy in his university. In 1713 there appeared a new edition of Newton's ‘Principia,’ thoroughly revised by the author with the assistance of Cotes, and containing an able defense of Newton's system from the pen of the latter. Cotes published only one independent work, an essay entitled ‘Logometria’ (1713); but after his death there appeared a volume entitled ‘Harmonia Mensurarum’ (1722). His name is still given to a theorem discovered by him relative to the circle. The correspondence of Newton and Cotes was published in 1850. Newton is reported to have said: “Had Cotes lived we might have known something.”

COTES, Sara Jeannette Duncan, Canadian author: b. Brantford, Ontario, Canada, 1862. She entered journalism as a correspondent for several Canadian and American newspapers at the Cotton Centennial in New Orleans in 1884–85; served on the staff of the Washington *Post,* Toronto *Globe* and Montreal *Star;* married in 1891 Everard C. Cotes, Simla, whom she accompanied to India. Her books include ‘A Social Departure’ (1890); ‘An American Girl in London’; ‘A Daughter of To-day’; ‘Vernon's Aunt, an Oriental Story’; ‘The Simple Adventure of a Mem Sahib’; ‘His Honor and a Lady’; ‘A Voyage of Consolation’ (1898); ‘The Path of a Star’ (1899); ‘On the Other Side of the Latch’ (1901); ‘Those Delightful Americans’ (1902); ‘Cinderella of Canada’ (1908); ‘The Consort’ (1912); ‘Her Royal Happiness’ (1915).

COTES-DU-NORD, kōt′dü-nōr′, France, a maritime department in the north, forming part of ancient Brittany; capital, Saint Brieuc; area, 2,786 square miles. The coast extends about 150 miles; the herring, pilchar and mackerel fishing is actively pursued. One of the main branches of industry is the rearing of cattle and horses; and in manufacturing, the spinning of flax and hemp and the weaving of linen and sail-cloth. Among the minerals are iron, lead and granite. Pop. 605,523.

COTGRAVE, Randle, English lexicographer: b. Cheshire; d. probably 1634.. He was secretary to William Cecil Lord Burghley, to whom he dedicated the French-English dictionary by which alone he is remembered. This work appeared in 1611, and is important not only as being the first of its kind, but as a valuable source of material for the elucidation of the philology of the English and French languages. It was remarkably accurate and reliable for its time, and has been several times reissued. Of Cotgrave's life very little is known.

COTHURNUS, kō-thėr′nŭs. See BUSKIN.

COTIDAL, kō-tī′dal, having the tides at the same moment of time. Cotidal lines are imaginary lines marked on the surface of the globe, indicating where the tides are in the same state at the same time.

COTILLON, kō-til′yon, a lively dance of French origin performed by eight persons together, resembling the quadrille which superseded it. The name is now given to a dance which often winds up a ball, and which is danced with any number of dancers and with a great variety of figures, the pairs of dancers following in this the leading pair, and partners being successively changed. Consult Grove, ‘Dancing’ (in the “Badminton Library,” London and Boston 1895).

COTIN, kō-tăṅ, **Charles,** French author: b. Paris 1604; d. there, January 1682. He is indebted for his notoriety, in a great measure, to the satires of Boileau. Among his poems are some which rise above mediocrity. It has often been supposed that Boileau introduced the name of Cotin into his satires because it furnished a convenient rhyme, and Moore refers to this in his ‘Life of Byron.’ Unluckily his follies drew upon him a new enemy in Molière, who, in his ‘Femmes Savantes,’ introduced him on the stage and exposed him to ridicule under the name Trissotin, which Molière at first wrote “Tricotin.” His knowledge of Oriental and classic languages was extensive and he was a member of the literary circle of the Hôtel Rambouillet. He was an abbé and a successful preacher. His ‘Œuvres Mêlées’ appeared in 1659 and his ‘Œuvres Galantes’ in 1663.

COTINGIDÆ, an extensive family of passerine birds, the cotingas allied to flycatchers, and inhabiting the forests of tropical America. They are of moderate or small size; frequent tall trees in most cases; and feed on insects, snails, etc., and also largely on berries and other small fruits. The plumage is ordinarily plain, rufous, green or gray, the females being nearly always dull, although many of the males are very brilliant, and some species are extraordinary among forest-birds in being pure white. The cotingas include some celebrated South American species, as the bill-bird, umbrella-bird and cock-of-the-rock.

COTNER UNIVERSITY, located at Bethany, Neb., was founded in 1889 under the auspices of the Disciples of Christ. It was named in honor of one of its most liberal patrons. The first building was erected on a prairie farm about five miles from Lincoln (q.v.), and the college was called Cotner. By the sale of lots a fund was obtained for the school, and the village of Bethany, which has grown up around the university, has a population of about 1,200. In 1915–16 there were connected with the school 27 professors and instructors, and, in the college department, 256 students. The library contained about 5,000 volumes; the grounds and buildings were valued at $134,000. The school has the following departments: College of Liberal Arts, embracing all branches of a university course, leading to A.B. and A.M. degrees; Normal College, for training teachers, leading to first grade and life professional certificates; Biblical College, for training preachers and mission workers; Academy, corresponding to the regular four years' high school course; School of Art, School of Music, School of Expression, Commercial School and School of Home Economics.

COTO, the reddish-brown, aromatic and slightly bitter bark from various South American sources, one of which seems to be *Palicourea densiflora*, order *Rubiaceæ*. It contains the substance *Cotoine*, $C_{14}H_{12}O_4$, which has been used in the treatment of intestinal disorders.

COTONEASTER, kō-tō-nē-ăs'ter, a genus of plants of the natural family *Rosaceæ*. They are closely related to Cratægus, but the fruit consists of bony carpels, each containing two similar ovules. There are some 20 species, mostly natives of Europe and western Asia. The plant is a shrub or small tree, some of the species being evergreen. It has been introduced and cultivated in the United States and England as an ornamental shrub, having bright red fruit which remains throughout the winter. The evergreen or fire-thorn (*C. pyracantha*) is a species which has escaped from cultivation and is found wild among the thickets about Philadelphia and Washington. Several species, among which are *C. microphylla* and *C. rotundifolia*, come from India, and are especially used for covering walls and rock-work. The seeds of these are said to contain prussic acid. Cotoneasters thrive in any good, well-drained garden soil not too shadily situated.

COTOPAXI, kō-tō-pä'hē or kō-tō-paks'ĭ, the most remarkable volcanic mountain of the Andes, in Ecuador, about 60 miles northeast of Chimborazo; lat. 0° 43′ S., long. 78° 40′ W. Its upper portion, a perfect cone 4,400 feet in height and perpetually snow-covered save near the crater, shows conspicuously. This covering of snow conceals from the eye of the observer the inequalities of the ground. No point or mass of rock penetrates the coating of snow and ice, or breaks the exact regularity of the conical figure. The crater is surrounded by a small circular wall, which, when viewed through a telescope, appears like a parapet. Its height above the sea is 19,550 feet. The valley at its foot, however, is itself 9,000 feet above the sea. Remarkable eruptions, spreading destruction over the surrounding plains, took place in 1698, 1738, 1742, 1744, 1766, 1803 and 1877. In 1698 the eruption destroyed the city of Tacunga, with three-fourths of its inhabitants, and other settlements. In 1744 its roarings were heard as far as Honda, on the Magdalena, 600 miles distant. With respect to the explosion of 1803, Humboldt observes: «At the port of Guayaquil, 52 leagues distant in a straight line from the crater, we heard day and night the noise of this volcano, like continued discharges of a battery; and we distinguished these tremendous sounds even on the Pacific Ocean.» A similar eruption took place in 1885. Part of a neighboring village was overwhelmed; and at Guayaquil a sound was heard like the incessant discharges of heavy artillery, shaking the earth and causing doors and windows to rattle. Humboldt found it difficult to ascend the mountain as far as the limit of perpetual snow, and he pronounced it impossible to reach the summit. It has been ascended, however, at least twice, on the latter occasion by Mr. Whymper in 1880, who remained 24 hours on the top. He reports that more or less smoke and steam are always issuing from the crater. The most recent violent eruption occurred in 1903.

COTSWOLD. See SHEEP, DOMESTIC.

COTTA, kŏt'tä, Johann Friedrich, BARON COTTENDORF, German publisher: b. Stuttgart, 27 April 1764; d. there, 29 Dec. 1832. He began business at Tübingen, but in 1811 removed to Stuttgart. He was the publisher for many great writers in Germany, including Goethe, Schiller, Wieland, Richter, Uhland, Fichte, Hegel, the Humboldts and others. He published Schiller's ‹Horen› (1795) and the *Allgemeine Zeitung* at Augsburg (1798). In politics he bent his efforts toward social reform, especially toward the improvement of his estates and the abolishment of serfdom.

COTTAGE, originally a small house with no land attached to it. Such erections were discouraged by old English law. No one was allowed to erect a cottage unless four acres of freehold land were attached to it; and no more than one family was to inhabit it. It had usually no second story, and was built of brick or stone, very rarely of wood. Recently the term has been extended to mean country houses of moderate extent, and especially summer residences of well-to-do families.

COTTER, Joseph B., American Roman Catholic prelate: b. Liverpool, England, 1844; d. Winona, Minn., 1909. He came to the United States in 1850, studied theology at Saint John's University, Collegeville, Minn., was ordained priest 1871, and was pastor of Saint Thomas' Church, Winona, Minn., 1871–89, when he was consecrated first bishop of the Roman Catholic see of Winona. He was a pronounced advocate of total abstinence, and was three times president of the Catholic Total Abstinence Union of America.

COTTER'S SATURDAY NIGHT, The. This poem, written while Burns was farming and composing poetry at Mossgiel, in 1785, depicts «the lowly train» of life that the poet best knew. Although in origin and form the poem is a hybrid — the plan and title suggested by Fergusson's 'Farmer's Ingle'; the scene and sentiment reminiscent of Gray and Goldsmith; the form a medley of English and Scottish idiom in Spenserian stanza — the inspiration and spirit are native. The poet's brother tells us that "the Cotter is an exact copy of my father in his manners, his family devotions, and exhortations." It is with genuine affection that Burns has pictured the home-coming of "the toil-worn Cotter" and his bairns, the welcome to the "neebor-lad," "the cheerful supper," the family worship around the ingle. This homely realism, this sincerity of feeling, have given to the poem not only its instant popularity, but its enduring place in English literature. Modern readers may find both forced sentimentality and artificial poetry in those stanzas in which Burns wholly abandons his native idiom, and with it his poetic instinct, for stilted eulogy of simple love and piety, and rhetorical scorn of betraying villainy and religion's pomp. But no one can fail to feel, in the scene itself and in the final stanzas, that truest love of country that is love of man. It is this humanity that has made Burns not only "the patriot-bard," but the poet of democracy, and 'The Cotter's Saturday Night' not only a Scottish interior, but an idyl of the people. Consult 'Cambridge History of English Literature' (Vol. XI, Chap. 10) and 'Dictionary of National Biography.'

FRANCES W. CUTLER.

COTTET, kŏ'tā', **Charles**, French landscape and genre painter: b. Puy, Haute-Loire, 1863. He studied under Maillard at the Académie Julien and under Roll. He at first joined the Impressionists and later helped to found the Société Nationale des Beaux-Arts. He is known chiefly as a painter of Breton subjects. A cycle of 10 landscapes, entitled 'The Country of the Sea' (1905), several of which are now in the Luxembourg, attracted wide attention. He also painted many Venetian, Egyptian, Algerian and Spanish subjects. There are also a few Icelandic landscapes by him. His paintings include 'The Port of Camaret,' and others in the Luxembourg Museum; 'Going to Church in Brittany' (Vienna); 'A Moonlight Night' (Philadelphia); 'Breton Women in Mourning' (Cincinnati). He is represented also in Buffalo and Providence, and is an officer of the Legion of Honor.

COTTIER TENURE, a system of tenure according to which laborers rent small portions of land directly from the owner, or from a farmer, often giving personal service as part of the rent, and holding by annual tenancy. Later the "cottiers" was used to denote peasant farmers whose rent was determined by competition. Ireland was the chief representative of this system. The same class was called "crofter" in the west of Scotland. The enactments of land laws by Parliament has changed the situation and alleviated the resulting evil conditions to some degree. See IRISH LAND LAWS.

COTTIN, kŏt-tăn̄, **Marie** (called also **Sophie**) **Risteau**, better known as MADAME COTTIN, French novelist: b. Paris, 22 March 1770; d. 25 Aug. 1807. In 1790 she married M. Cottin, a banker of Bordeaux, who died in 1793, and thenceforth she followed literature. Her best-known work is 'Elizabeth, ou les exilés de Sibérie' which was imitated by Xavier de Maistre in 'La jeune Sibérienne.' It was translated into English by G. R. Lockwood (New York 1869); other novels are 'Claire d'Albe'; 'Malvina'; 'Amélie'; and 'Mathilde.' Consult Saint-Beuve, 'Causeries du Lundi' (Vol. XII); and Kavanaugh, Julia, 'French Women of Letters' (Leipzig 1862).

COTTLE, Joseph, English bookseller and author: b. 1770; d. Bristol, 7 June 1853. The earliest poems of Southey and Coleridge were published by him, and these two poets in later life expressed their appreciation of his assistance and kindness to them. He also published Coleridge's periodical, *The Watchman*, and the 'Lyrical Ballads of Coleridge and Wordsworth' (1798). He then retired from business. His own works include 'Malvern Hills'; 'John the Baptist'; 'Alfred, an Epic'; 'The Messiah.' Cottle's poems, and those by his brother, Amos, are satirized in Byron's 'English Bards and Scotch Reviewers.' A prose work, 'Early Recollections,' chiefly relating to Samuel Taylor Coleridge (1837), is marked by glaring bad taste, though it has some value as containing many details of the early life of the poet. A second edition appeared (1847), entitled 'Reminiscences of Coleridge and Southey.'

COTTON, Charles, English poet and translator: b. Beresford Hall, Staffordshire, 28 April 1630; d. Westminster, February 1687. In 1658 he inherited his father's estates, near the river Dove, on the banks of which he built a fishing house, in which he entertained for years his friend Izaak Walton. His works are numerous and nearly all in verse, including 'Scarronides, or Virgil Travestie' (1664–70), being the first and fourth books of Virgil's 'Æneid,' in rather indelicate burlesque; and a translation of Montaigne's 'Essays' (1685), his best work. After the death of Cotton a volume was published, entitled 'Poems on Several Occasions.' He also translated 'Horace,' a tragedy of Corneille (1671); but the work by which he will be best remembered is the part which he added to the fifth edition of Walton's Complete Angler — 'Instructions How to Angle for a Trout and Grayling in a Clear Stream.'

COTTON, Charles Stanhope, American naval officer: b. Milwaukee, Wis., 15 Feb. 1843; d. Nice, 19 Feb. 1909. He entered the Naval Academy 1858, served on the frigate *Saint Lawrence*, which captured the Confederate privateer *Petrel*, in July 1861; on the flagship *Minnesota* 1861–63; took part in the battle between the *Monitor* and *Merrimac* 8–9 March 1862; and served during the battle of Mobile Bay and subsequent operations to the surrender of Fort Morgan. He was promoted commander, 25 April 1877, and was on the Asiatic station 1880–83; captain 28 May 1892, and commanded the flagship *Philadelphia* on the Pacific station 1894–97. During the war with Spain he commanded the auxiliary cruiser *Harvard*. In 1900 he became rear-admiral and from 1903 commanded the European squadron.

COTTON, John, American Puritan clergyman: b. Derby, England, 4 Dec. 1585; d. Boston, Mass., 23 Dec. 1652. He was educated at Trinity College, Cambridge, and was afterward Fellow of Emmanuel and employed as lecturer and tutor. About 1612 he became vicar of Saint Botolph's Church in Boston, Lincolnshire, where he remained 20 years, noted as a preacher and controversialist, and inclining in his doctrines and practices toward the Puritan worship. He was at length informed against for not kneeling at the sacrament and cited to appear before Archbishop Laud in the high commission court. Upon this he sought safety in flight, arriving in Boston 4 Sept. 1633. In October he was ordained on a day of fasting, by imposition of hands by the minister and two elders, teacher of the church in Boston and colleague with Mr. Wilson the pastor. In this connection he remained over 19 years, with such influence and standing that he has been called the patriarch of New England. His reputation for learning was very high, and, as was frequent among the ministers of that time, was sustained by the accumulation of obscure and professional knowledge. He was a critic in Greek, wrote Latin with elegance, and could discourse in Hebrew, and spent 12 hours a day in reading, his favorite author being Calvin. His pulpit eloquence was famous for its simplicity and plainness, and his discourses were exceedingly effectual in exciting attention to religion. His publications were numerous, consisting of sermons and controversial works upon most of the subjects discussed in his time. The most important are those published in the course of his controversy with Roger Williams, ‘The Bloody Tenent Washed and Made White in the Blood of the Lamb’ (1647), etc., and ‘The Keys to the Kingdom of Heaven and the Power Thereof,’ on the nature of church government. He maintained that the church is constituted of elders and brethren; that the elders are entrusted with the government to the extent of admissions and excommunications, yet that there is so much liberty left among the brethren that nothing of common concern can be imposed upon them without their consent. Against Williams he defended the interference of the civil power in religious matters for the support of the truth, maintaining the duty, for the good of the church and of the people, of putting away those who, after repeated admonitions, persist in rejecting fundamental points of doctrine or worship. A tablet, with a Latin inscription by Edward Everett, was erected in Saint Botolph's Church in 1857, in honor of Cotton, chiefly by contributions from his descendants in Boston, Mass. He published 50 volumes, among the most important of which are ‘A Brief Exposition upon Ecclesiastes’; ‘A Brief Exposition upon Canticles’; ‘A Treatise Concerning Predestination,’ and the famous catechism entitled ‘Spiritual Milk for Babes,’ etc. A part of his controversy with Roger Williams may be found in the *Publications of the Narragansett Club* (Vols. I and II, Providence 1866–67). Consult Cotton, Mather, ‘Magnalia’ (1702); McClure, ‘Life of John Cotton’ (1846); Tyler, ‘History of American Literature’ (1878); Norton, ‘Abel Being Dead, Yet Speaketh: or the Life and Death of that Deservedly Famous Man, John Cotton’ (London 1658; Boston 1834).

COTTON, Sir Robert Bruce, English antiquarian: b. Denton, Huntingdonshire, 22 Jan. 1571; d. London, 6 May 1631. He was educated at Westminster School under the famous Camden; and later at Cambridge. He settled in London, devoting his time to antiquarian pursuits, and employing himself especially in collecting ancient deeds, charters, letters and other manuscripts of various kinds, illustrative of the history of England. He was one of the earliest members of the Antiquarian Society; and not only promoted the general objects of that learned association, but also assisted, with his literary treasures as well as with his purse, Camden and other writers on British archæology. He sat in Parliament under James I and in the first and third Parliaments of Charles I's reign, his sympathy being against the growing power of the king. In 1629 he was falsely accused of having written an obnoxious political tract, and was thrown into the Tower; yet although he succeeded in establishing his innocence, his library was sequestrated, and his death seems to have been partly due to his being deprived of the company of his books. Among his works may be mentioned, ‘Power of the Peeres and Comons of Parliament in Point of Judicature’ (1640); ‘Cottoni Postuma — Choice Pieces of that Renowned Antiquary’ (1672); ‘Divers Short Pieces Exposed to Publick Light by J. Howell’ (1679); ‘Speech before the Privy Council touching the Alteration of Coyn’ (published in Shaw, ‘Select Tracts and Documents,’ 1896). Consult Kiffis, ‘Robert Bruce Cotton’ (in ‘Biographia Brittanica,’ London 1797); D'Ewes, ‘Autobiography’ (2 vols., ib., 1845); Nichols, ‘Progresses of James I’ (4 vols., ib. 1828); Gardner, ‘History of England’ (ib. 1883–84). See COTTONIAN LIBRARY.

COTTON. This important vegetable fibre is readily distinguished from all other commercial fibres by its spiral twist, a character that renders it especially valuable for spinning. The wide-spread distribution of the plant, its adaptability to a great variety of soils and climates, and its comparative cheapness, all tend to make it one of the great staples of agricultural production, and it is probably used by more people and for a wider range of purposes than any other fibre. The country in which cotton was first used has not been definitely determined. It had long been known in India before the conquest of that country by Alexander. The writings of Herodotus and Pliny tell us that the excellence of its fibre was known to the Greeks and Romans. Columbus found it in use by the natives of the New World and in the conquests of Mexico and Peru cotton cloth was found to be in use. Ancient Peruvian tombs have yielded mummy cloths of cotton but those obtained from Egyptian tombs appear to be linen, although it is probable that cotton was known in that country from quite early times. While the principal commericial value attaches to the beautiful fibre that surrounds the seeds, the seeds themselves have important uses aside from that of producing a new crop. The stems and roots are also of value and the so-called by-products now utilized add fully 20 per cent to the value of the commercial cotton crop.

Botany, Commercial Classification, etc.— The cotton of commerce is a product of plants of the genus *Gossypium,* a member of the *Malvaceæ* or Mallow family of plants. There have been many attempts to classify and limit the species of *Gossypium,* but no two authorities agree. In a recent widely known catalogue of plants, about 50 species are recognized, and probably four or five times as many names combined or rejected. While this list of names is quite large there are only five or six species whose product enters into commerce and the bulk of the production is the product of two species, G. *herbaceum,* which furnishes the Upland cottons, and G. *barbadense,* the source of the Sea Island cotton. All the species are of tropical origin. They are small trees, shrubs or herbaceous plants, enduring for one, two or more years, dependent upon the species. There has been much discussion regarding the origin of the many varieties of cotton grown in this country, but by almost common consent they are all attributed to the two species mentioned above or to some of their numerous hybrids. The Sea Island cotton is undoubtedly indigenous to America and was the type observed by Columbus, but the evidence for the American origin of the species to which the Upland cottons are referred is less conclusive. These two classes of cotton differ materially in their seed characteristics. The Sea Island has a small black seed from which the lint separates readily, while the Upland cottons have large seeds which are greenish in color and surrounded by a short dense fuzz beneath the longer and more valuable lint. Both of the species are perennial in climates without frost, but in cultivation they are treated as annuals. The plants are shrubby, 3 to 10 feet high, more or less branched and bear large, alternate 3- to 5-lobed leaves which when held to the light show numerous pellucid dots. The flowers, which resemble to a degree those of the hollyhock, mallow and hibiscus, are white when newly open in the varieties of Upland cotton, turning red with age, and a creamy yellow in the Sea Island, with a purplish spot at the base of the petals. The flowers are usually single in the axils of the leaves except in those varieties designated «cluster types» in which a number are produced together. Surrounding this conspicuous flower are three or more heart-shaped, fringed or deeply cut bracts which constitute the so-called «squares.» The indentations of the squares are deeper and more numerous in the Sea Island varieties than in the Upland forms. The capsules within the squares are the «bolls.» They are 3- to 5-celled and contain the seed covered with the white or slightly tawny lint. The bolls of Sea Island cottons are uniformly smaller and more sharply pointed, contain fewer and smaller seeds and longer lint than the Upland bolls. The lint of the Sea Island cotton is from one and one-half to two and a half inches in length, while the Upland cotton of the G. *herbaceum* type seldom exceeds one and a half inches in length and much of it is shorter. There are numerous hybrids between these two types as is shown by the character of the seed and lint. The Sea Island cotton flourishes along the coast region of South Carolina, Georgia and Florida, and also in Egypt, the famous Egyptian cotton being a development from American Sea Island cotton seed sent to Egypt a number of years ago. The varieties of Sea Island cotton furnish the finest and most valuable fibre, but their production is restricted by the soil and climatic requirements of the plants. The Upland varieties, while not furnishing so fine a quality of fibre, are grown over a much wider territory and the total production far exceeds that of the Sea Island. In India there is a perennial species to which the name G. *arboreum* is given. It is a small tree and grows about the temples, but is not cultivated to any considerable extent. It produces a fine silky staple, but its former high value is now believed to have been overrated. This cotton usually called Nurma, from its growing about temples, is also known as Deo cotton. From South America are received a number of varieties of cotton that have usually been attributed to G. *peruvianum.* They have a short, strong, curly fibre somewhat resembling wool and their smooth black seeds adhere in an oval mass, on which account they are called kidney cottons. The plant which produces this cotton is a small short-lived tree and like the Nurma cotton of India will not mature in the United States.

When considered commercially the fibre produced by the seed is the most valuable product of the cotton plant. Viewed under a good microscope it appears to be an irregular, flattened, twisted tube, the edges of which are somewhat thickened and corrugated. This twist distinguishes cotton from all other fibres and it is to this character that its superior value for spinning is due. The fibre of some of the wild species of cotton does not possess this twist and such as do not are of little value. If not thoroughly matured the fibre is more flattened, less twisted and thinner walled. Such fibres, if abundant in a sample, depreciate its value as they curl up, do not spin well nor dye evenly. Among the leading commercial types of cotton the fibre varies from one-half inch to two inches or more in length and is exceedingly fine, the extreme diameter measurements being 0.0084 to 0.0064 inch, the longest and finest fibre being of the Sea Island types. The commercial grading of cotton is as follows: Samples, the average fibre of which is under 0.98 inch (25 millimeters) in length are called «short staple»; those between 0.98 and 1.17 inches (25 to 30 millimeters) are called «medium» and from 1.18 to 1.57 inches (30 to 40 millimeters) are called «long staple.» Those exceeding 1.58 (40 millimeters) are «extra long.» The «long» and «extra long» fibre produced in the United States are all from Sea Island varieties and their hybrids, the shorter ones being usually Upland cottons of the G. *herbaceum* type. Other classifications adopted by the New York Cotton Exchange are: What are known as «full grades» are designated by the words «fair,» «middling fair,» «good middling,» «middling,» «low middling,» «good ordinary» and «ordinary.»

To designate qualities of staple a half grade above the grades mentioned, the prefix «strictly» is used. Quarter grades between the half grade and the next higher full grade are referred to as «barley» prefixed to the full grade term and the quarter grade below the half grade is designated by the prefix «fully» to the full grade below. As examples a staple graded as «barley middling» is a quarter grade below middling, «strict low middling» is a half grade between middling and low middling and «fully low middling» is the quarter grade between the last and low middling, a full grade. This classification is generally adopted in this country, while for Europe that of Liverpool is followed. This differs from that of the New York Exchange in being somewhat higher in the low grades and lower in the high grades. These classifications are based not only upon the length of staple, but its fineness, color, freedom from dirt, etc., and are more or less subject to differences in judgment, although little variation will be noticed in determining the quality of a sample when presented for sale.

Like every crop of wide cultivation many varieties of cotton have been produced and named. Some of these achieved a wide reputation for some superior quality, flourished for a time and then disappeared. In 1880 the census report named 58 well-known varieties, but in less than 15 years only six were still in common cultivation. In 1896, in a publication of the United States Department of Agriculture, more than 130 varieties were described, but within half a dozen years many of them had disappeared from seedsmen's lists. While particular varieties may cease of cultivation in a short time, the general type remains and types of cotton can now be readily recognized that have been in cultivation for more than half a century. The well-known tendency of the plant to vary is responsible for the production of so many varieties. There is perhaps no cultivated plant that responds so quickly to changed conditions of soil, climate and cultivation as the cotton plant, and to this can be ascribed the improvement and deterioration of many varieties. The most successful planters keep up the quality of their crop by continued selection of seed and for a crop that depends so much on the quality of the staple this is one of the most important considerations. The practice of planting seed purchased from gins and mills does more to depreciate the quality of the lint than any other factor.

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COTTON CULTIVATION IN THE UNITED STATES. From the time its seeds are planted until it reaches the consumer in its variously manufactured forms cotton employs more human beings than any other product or industry. This is not surprising when we consider that 2,500,000 farmers and laborers produce the crops of the United States, about 1,500,000 the crops of other countries, and that about 1,750,000 wage earners throughout the world are employed in its manufacture, to say nothing of the many thousands who manipulate the crop from the time it leaves the producer until it reaches the mill and the consumer.

Cotton Area.— The cotton producing region of the United States embraces nearly all of the territory lying south of the 37th degree of latitude, and covers 25 degrees of longitude and 10 degrees of latitude. A line drawn from Norfolk County, Va., to Presidio County, Tex.— more than 1,300 miles — would indicate the eastern and western limits of the cotton area, and a line from Osage County, Okla., to the mouth of the Rio Grande in Texas — about 500 miles — the northern and southern limits. Cotton is cultivated in only eight counties in the extreme southeastern corner of Virginia, while in North Carolina its cultivation extends from the coast to the mountain ranges of the western part of the State. In South Carolina it is cultivated in every county, and the same may be said of Alabama, and of Georgia — except as to four mountain counties on the northern border. In all Mississippi only two counties on the Gulf Coast may be excepted. The cotton growing section of Florida extends from its western boundary almost to the Atlantic Ocean, and as far south as Sumter County, and in Tennessee it embraces all of the territory lying west of the Tennessee River, and includes a half-dozen counties in the southern central section and three counties in the extreme southeast corner of the State. In Missouri 8 or 10 counties in the extreme southeast and lying along the Arkansas State line cultivate cotton to a limited extent, and all of the counties in Arkansas except the four mountain counties in the extreme northwest. All of the Louisiana parishes grow cotton except one in the southwest, and eight in the southeast section bordering the Gulf and lying adjacent to the mouth of the Mississippi. Of the 250 counties in Texas all cultivate cotton except 38 located in the Pan Handle and the extreme west, and in Oklahoma all except nine lying along the Kansas border. Outside of what is known as the great cotton belt cotton is cultivated to a limited extent in Fulton County, Ky.; Eddy County, N. Mex.; Yuma, and Manicopa counties, Ariz.; Imperial, and Riverside counties, Cal.

Geographical Divisions.— Geographically the cotton States may be divided as follows: Atlantic States — consisting of Virginia, North Carolina, South Carolina, Georgia and Florida; Middle Gulf States — Alabama, Mississippi, Louisiana, Arkansas, Tennessee and Missouri; Southwestern States — Texas and Oklahoma. Of the total area devoted to cotton the Atlantic States cultivate about 27 per cent, the Middle Gulf States about 33 per cent and the Southwestern States 40 per cent. The largest area ever devoted to cotton was 37,406,000 acres planted in 1914.

Limits of Area.— But this by no means represents the limit of the tillable area that might be put in cotton. Of the total cultivated area in the 10 principal cotton States only an average of 44.5 per cent is planted in cotton, about 41 per cent in corn, about 12.5 per cent in wheat, oats and hay, and the remainder in miscellaneous crops. Texas could double its present cotton area without encroaching upon other crops, and likewise Oklahoma could greatly increase its cotton area. Besides there are large areas in southern California, Arizona, Nevada, New Mexico, Utah, Kansas and Kentucky suitable for cotton culture. In addition to this there are in nine of the principal cotton States (not including Florida and Tennessee) nearly 31,000,000 acres in swamp and overflow lands, about 17,000,000 acres of which, if reclaimed, would be suitable for cotton growing.

Climate.— Considering its climate and soil there is no such extensive area anywhere in the world so favorably adapted to cotton production as the Southern States. The plant is essentially a sun plant and thrives in a warm and even hot atmosphere if sufficiently moist. As it requires from six to seven months of favorable weather for full development there should be an absence of killing frost from early in the spring to late in the fall. The temperature should be high, and the daily range of comparative uniformity during the early growing period. It should increase from the time the seed is planted until about the first to the middle of August. By this time the plant should have attained its full vegetable growth. After this date a decreasing temperature with a greater range between day and night are favorable to the production of a full crop, as this checks the vegetable growth and induces the plant to convert its accumulated food material into fruit. During the earlier period, say in April and May, there should be frequent showers rather than heavy or continuous rains, and the best seasons are when those showers occur at night, permitting, with a sufficient and well-distributed rainfall, the greatest amount of sunshine. There should be an abundance of rain in July and August. Generally the normal rainfall in the South increases from the spring to the middle of summer when it decreases, the climate during the autumn being remarkable dry and bracing. Such conditions are essential to successful cotton production, and the Southern States are highly favored with just such conditions.

Frost.— In the cotton States heavy frosts generally cease by the middle of April, and as most of the cotton is planted from 1 April to 10 May, except in the extreme southern section where killing frosts are of rare occurrence, there is ample time for the seed to germinate and appear above ground without serious damage. The average date of killing frosts in the autumn in the northern section of the cotton belt is about 1 November, and in the southern section about 15 November.

Temperature.— The average maximum and minimum temperatures for the northern, middle and southern sections are as follows:

MAXIMUM AND MINIMUM TEMPERATURE

	Section	Apl.	May	June	July	Aug.	Sept.	Oct.	Nov.
		°F	°F	°F	°F	°F	°F	°F	°F
MAXIMUM	Northern	72.6	80.1	87.2	89.9	87.0	81.3	72.0	60.0
	Middle	72.0	79.8	86.3	88.8	87.3	82.8	73.7	64.3
	Southern	78.0	83.6	89.0	91.1	90.0	86.0	78.8	69.8
MINIMUM	Northern	49.8	57.5	65.4	69.0	67.3	61.2	50.9	39.6
	Middle	54.8	61.9	69.1	72.2	71.7	67.0	56.6	46.9
	Southern	61.3	67.2	73.6	75.6	74.2	70.5	62.9	53.3

Rainfall.— The rainfall varies from month to month and from season to season, the average precipitation in some of the States even differing considerably. Texas, for instance, makes its crops with an average rainfall during the season of less than three inches, while the crops of Louisiana are made with an average of about five inches. The following is the average rainfall for 10 years (1904–13) in the 10 principal States, from April to November, inclusive (inches): North Carolina, 4.27; South Carolina, 4.15; Georgia, 3.94; Alabama, 4.10; Mississippi, 4.36; Louisiana, 5.02; Arkansas, 4.23; Tennessee, 3.89; Texas, 2.88; Oklahoma, 3.29. The following is the 10-year average monthly rainfall during the growing and maturing season in each of the geographical divisions:

AVERAGE MONTHLY RAINFALL (Inches)

SECTION	Apl.	May	June	July	Aug.	Sept.	Oct.	Nov.
Atlantic States	3.41	3.68	5.18	5.65	5.82	3.81	2.86	2.23
Gulf States	5.38	5.18	4.50	5.48	4.19	4.08	2.67	3.00
Southwestern States	3.32	4.32	3.56	3.04	2.58	2.78	2.77	2.28
All States	4.38	4.55	4.52	5.04	4.12	3.74	2.75	2.63

The average for the entire season in the Atlantic States is 4.08 inches, in the Middle Gulf States 4.31 inches, in the Southwestern States 3.08 inches and for all States 3.97 inches.

Soil.— Within the limits of the cotton belt, wherever climatic conditions are favorable, cotton may be produced on almost any character of soil. It is grown on light sandy soils, on loams, on heavy clay and bottom lands, the yield varying with the different types. On light sandy soils, unless well fertilized the yield is small; on clay and bottom lands the yield is good, unless the rainfall happens to be excessive, when the plants develop too much stalk and limb at the expense of fruit. The fine prairie lands of Texas are high in yield, but are often subject to prolonged droughts, while the Delta lands of the Mississippi, the most fertile in the South, are liable to overflow. Perhaps the safest soils for the cotton plant are the medium grades of loam. Without considering their chemical composition, the soils of the cotton belt may be classified as follows: pine levels and pine hills, metamorphic or Piedmont region, alluvial lands, oak and hickory region, black prairie lands, bluff and brown loam table lands, red loam lands, valley lands and sand hills. The pine levels and pine hills, which produce about 18½ per cent of the cotton crop, extend all along the Atlantic and Gulf coasts from Virginia to the Trinity River in Texas, the width of which varies from 50 to more than 150 miles. The metamorphic or Piedmont region, producing about 17 per cent of the crop, lies along the border of the pine hills region and extends through North and South Carolina, Georgia and well into Alabama. The prairie lands, which generally produce the largest proportion of the crop, or nearly 21 per cent, including the black prairies of Alabama, Mississippi and Texas, the coast prairies of Louisiana and Texas, the gray silt prairies of Arkansas and the red loam prairies of western Texas. The oak and hickory lands upon which about 14½ per cent of the crop is made extends over eastern Texas and northwestern Louisiana and southeastern Arkansas to the Mississippi bottom lands. Four counties in western Alabama and three in northeastern Mississippi are included in this region. The alluvial lands, yielding nearly 15 per cent of the crop, cover extensive areas in all of the Southern States and in almost every region in each State. The bluff and brown loam table lands lying east of the Mississippi Delta extend all the way from the mouth of the Ohio River to Baton Rouge, La. These lands produce about 7 per cent of the crop. The valley region of the Tennessee River in Alabama and Tennessee, and the valleys of the Coosa River and its tributaries in Alabama and Georgia, make about 3 per cent of the crop, while the red loam lands in the northern half of Arkansas and in southeastern Oklahoma make about 2½ per cent.

Land Tenure.— According to the United States census of 1910, there were 1,714,149 farms that cultivated 32,043,838 acres in cotton and which produced 10,649,268 bales (501.7 lbs. to the bale), each farm averaging 18.7 acres and producing 6.2 bales to the farm. In the 10 principal cotton growing States there were 2,196,768 farmers, 1,421,991 whites and 774,777 negroes, or 65 per cent whites and 35 per cent negroes. This would indicate that about 65 per cent of the cotton crop is produced by white labor. This proportion however has increased since 1910, due to the cultivation of new lands in Texas and Oklahoma, so that the proportion of the crop now made by white labor is approximately 70 per cent. Farm tenure is divided into three general classes, viz.: Owners and managers for owners, cash-tenants and share-tenants. Owners and managers constitute about 44 per cent, share-tenants about 38½ per cent and cash-tenants about 17½ per cent. As between land owners and managers, and tenants, land tenure is apportioned between the two races about as follows: white owners and managers 36.2 per cent, white tenants 28.5 per cent, negro owners and managers 7.2 per cent and negro tenants 28.1 per cent. Landowners and managers operate upon practically a cash basis — so far as labor is concerned — while cash tenants pay a money rent and supply themselves.

Share System.— The share system is based upon the practice of the landowner taking for rent a share of the crop, the share depending upon whether the land is cultivated mostly in corn or cotton, and to what extent the owner supplies the tenant with the necessities for making the crop. Some share-tenants furnish themselves with everything and pay one-fourth of the crop for the use of the land. Others look to the landowner to furnish the fertilizers, pay blacksmith accounts, keep of stock, etc., in which case one-half the crop is given for the use of the land. Another class of share tenants are those who furnish nothing but their labor, the landowner taking two-thirds of the crop to cover land rent and expenses.

Cultivation.— The methods of cultivating cotton differ somewhat in the different sections according to the character of the soil. A diversity of methods and a diversity of implements may be observed even in the same locality and when the same kind of soil is cultivated. The farmers in the pine hills practise shallow culture, while those of the prairie lands believe in deep culture; in the one case single-horse plows are used, in the other heavy double-horse plows. In some sections most of the cultivation is done with hand hoes, and in others with two-horse cultivators. On alluvial soils when the crop is laid by the land is generally left almost level, on most other soils in ridges or beds. In the southern part of Texas preparation for the crop begins 1 December, in many other regions plowing begins as near the time for planting as possible. In the eastern section commercial fertilizers are in general use, in many other sections none at all are used. On many farms crop rotation is followed, but the great bulk of the cotton crop is grown on the cotton lands of the previous year. After the final picking and before plowing for the new crop begins the old stalks or stubble must be disposed of. On some farms they are knocked down, allowed to decay and are turned under the soil with other vegetable matter. On other farms when the stalks are unusually large and the season is late they are knocked down and burned. Some farmers attach a drag chain to the mule and plow so arranged that the stalks may be drawn under the plow, broken up and turned under. The more progressive farmers use a stalk cutter usually attached to a cultivator. It is generally conceded that in preparing for a cotton crop the lands should be broken up as early as possible after the crop has been gathered, the earlier the better, so that all vegetation may be turned under while green and sappy, and so that the soil may be disintegrated and the insects killed by the winter freezes. The plowing may be done in the fall or during the winter, or sometimes it cannot be done until spring. It all depends upon whether the old crop is early or late, whether the yield is light or heavy, or upon weather conditions. It often happens during February, or even in March, that picking the last of the old crop and plowing for the new one are going on at the same time in the same field. However, if possible, the land should be thoroughly broken up with a two-horse team, using a plow that will turn the soil 8 to 12 inches deep, the depth being governed by the character of the soil.

Bedding Up.— After breaking up the land the next thing to be done is to bed it up. For this purpose a one-horse turning plow should be used, the bed being formed by turning a furrow along one side of the field and another on the opposite side, running parallel to it and so close that the two furrows may lap. This may be repeated to build up the beds to the proper height. The beds are spaced at varying distances, on thin lands 2½ feet apart, on rich alluvial lands as in Mississippi Delta where the plants grow 6 to 10 feet high, at 6 feet. The average distance is about 4 feet. It is not an uncommon practice, where cotton follows cotton, not to break up the land at all, but to form the beds upon the alley left between the beds

COTTON

1 Picking Cotton from a Field in Georgia **2 Hauling Cotton from the Field to the Gin House**
3 A Cotton Field showing Squares, Blooms, and Bolls

COTTON

1 Weighing Cotton in the Field after the Day's Picking 2 Weighing Baskets of Cotton after the Day's Picking
3 Picking Cotton from a Field in Georgia

of the previous crop. Sometimes fertilizers are dropped into the alley before the bedding begins. After bedding up is completed the next step is "bursting out the middles," or plowing out the alley with a "middle burster." This plow not only cleans out the alley but throws the soil upon either side of the bed making it more compact and leaving a good drainage trench.

Fertilizing.— Many varieties of fertilizers are used in cultivating cotton. Barn-yard manure, cotton seed composted with stable manure and acid phosphate, and cotton seed meal mixed with acids are used to a limited extent, but the commercial fertilizers that contain available phosphoric acid, nitrogen or potash are in general use. Some of the cheap fertilizers contain only a small per cent of plant food, while the higher grades of "complete fertilizers" contain a very large per cent. Fertilizers should be carefully selected and determined by analysis, for what may benefit one character of soil may be injurious to another. In the northern section of the cotton belt where the season is shortest a fertilizer should be selected that will force maturity, and such fertilizers should also be used in the boll weevil infested territory. The quantity to be applied to the acre is a matter of judgment, dependent upon the quality of the fertilizer and the character of the soil. Some lands may require a half ton to produce the best results, others much less. The average quantity applied to the acre in all the cotton States is about 400 pounds. Some farmers still adhere to the old method of applying the fertilizer, using a tin tube 5 or 6 feet long with a funnel at the upper end. The funnel is fed by hand from a bag filled with the fertilizer and suspended from the shoulder, the end of the tube being inserted in the soil where the fertilizer is to be dropped. Home-made fertilizers are generally broadcasted and harrowed in before the land is bedded up. The up-to-date farmer puts in his fertilizer with a machine, consisting of a hopper mounted on a frame something like that of a wheel-barrow.. The fertilizer is evenly distributed from the movable bottom of the hopper which alternately opens and closes by the revolutions of the wheel. Two shoes attached to the rear of the machine cover up the fertilizer.

Seed Selection.— The seed to be planted should be carefully selected and reserved from the first pickings of the bottom or middle fruit of the plant, never from the last picking, or top crop. It would be far better if the seed could be taken from selected plants or rows of plants of prolific yield. Unfortunately too little attention is paid to seed selection, the common practice being to take the required number of bushels of seed promiscuously just as they come from the gin, or to buy them from a neighboring oil mill. There are any number of varieties of seed. Among the favorite early varieties are Cherry Cluster, Dickson, Drake Cluster, King and Welborn Pet; of the medium (date) varieties, Bates Big Boll, Boyd Prolific, Herlong, Peterkin and Petite Gulf; and of the late varieties Allen, Cook, Mammoth Prolific, Peeler and Texas Storm Proof. The seed are now planted almost entirely with machines, except where the stands are irregular and broken, when replanting is done by hand and with the use of the hoe. A few farmers still adhere to the old method of opening the top of the bed with a light bull tongue plow, dropping in the seed by hand and covering them with a block or board drawn over the bed. The machine planter now used is so arranged as to open the drill, drop the seed and cover them. It not only economises the seed, distributes them more uniformly, but ensures a better stand while facilitating cultivation. Some of these machines also distribute fertilizers along with the seed, but this is not considered the most advisable method of fertilizing.

Date of Planting.— The date of planting varies according to latitude and local conditions. There are a group of some thirty-odd counties in south Texas bordering the Gulf, between the eastern and western limits of the State, and a few other counties in the extreme southern section of the Gulf States, that begin planting as early as 1 March, and continue until the middle of the month. The tier of counties lying just above these, averaging about five from south to north, and stretching across the belt from the Atlantic Ocean almost to the Rio Grande River, begin planting about 15 March and continue until 1 April. In the next tier of counties, covering the middle section and extending from the Atlantic to the western limit of the Texas cotton fields, the average date of planting is from 1 April to 15 April. The most northern tier of counties, extending from the Atlantic to the Pan Handle in Texas, begin planting about 15 April and sometimes continue until the middle of May.

Chopping Out.— With favorable weather the seed ought to germinate within a week. As soon as the plants have formed three or four leaves and have attained a few inches in height, they should be thinned or chopped out to a stand. This is done with the hoe, the distance left between the plants depending on the character of the soil and the usual size of the plants when full grown. On the fertile lands of Mississippi, Louisiana and Texas, where the plants grow 6 or 8 feet high, as much as 2 and sometimes 3 feet are left between the plants. On the poorest lands the distance is usually 8 to 12 inches, and on good soils 12 to 15 inches. Chopping to a stand is usually done in May, unless the season is late. If the season is unfavorable and the seed have come up so irregularly as to necessitate replanting, the chopping out to a stand may go on until the middle of June and even later. After the thinning out process a turning or shovel plow is used to bar off the soil from each side of the bed and kill the young grass. A sweep is then run through the alley or trench between the beds throwing the soil back upon the bed and close up to the plants. Following this at different intervals the crop should have at least three hoeings and three to four plowings. The soil must be continually and industriously disturbed, not only to keep down grass and weeds, but to conserve moisture. This cultivation should be kept up until the crop is finally "laid by," which is usually during the first half of July if the season is favorable. The different stages of cultivation may be summarized as follows: Breaking up and plowing in January, February and March; planting the seed in April; chopping out in May; cultivating with plow and hoe in June; laying by the crop in July and August; picking in September, October, November and December. During the process of cultivation the plant has developed stalk and limb, squares have appeared, developed into blossoms and the young fruit or bolls have formed.

Blooms and Bolls.— The first blooms appear about 15 May in southwest Texas, 20 May in central Texas, Louisiana and southwest Georgia; 1 June in the Mississippi bottoms, south Arkansas and middle Georgia; 10 June, in the pine hills of South Carolina, middle Alabama and central Georgia; 20 June, in northwest Louisiana, middle Arkansas, northwest Georgia and southern North Carolina; 4 July, in north Arkansas and north Texas; 10 July in northeast North Carolina; 25 July in western Tennessee and Oklahoma. The first bolls open about 15 May in south Texas; 25 June in middle Texas; 1 July in south Louisiana; 10–15 July in central Louisiana, south Georgia, the pine hills of South Carolina; 1 August northwest Louisiana, south Arkansas, coast of North Carolina; 1 September, Piedmont region, North Carolina, Texas prairies; 15 September, north Arkansas and Oklahoma.

Picking.— The ingenuity of man has not yet overcome the difficulties of picking cotton by machinery. In recent years a number of machines for this purpose have been invented and tested, but so far none has proved successful. If the plants were of more uniform height, and if the fruit ripened all at once, success might be attained. But the plant varies in height from 2½ or 3 feet to 8 or 10 feet, and the fruit ripens continuously from August to mid-winter. Even when the fields are ready for the first picking the plants are filled with young tender bolls of all stages of growth that are likely to be irreparably damaged by a machine. So that hand picking goes on as in centuries past, and there is not yet in sight the promise of relief from the most tedious and expensive process connected with cotton culture. Picking, unless the crop is unusually late, begins in south Texas and the southermost counties of Georgia and the Gulf States in July and August, and at later dates in the three other divisions corresponding in variation to the dates of planting assigned to each, as given elsewhere. Before the season is over the fields are picked over three or four times, and even oftener. However, they should be kept clean of open cotton to avoid injury by unfavorable weather and loss by wind storms blowing the cotton to the ground. The hands, men, women and children — and often every available one in the community is employed — go into the field as soon as the dew is off of the plant, each taking a row of cotton and picking the lint from the bolls until the sack strapped across the shoulder is filled. The cotton is emptied into large baskets and the baskets when filled are weighed and each hand credited with the day's picking. The cotton is then hauled in wagons to the bins or to the plantation ginhouse. Many small farmers and tenants never store the seed cotton but haul it to the public gins where it is weighed and sold to the ginner, the price paid being about one-third of that paid for the lint after it is ginned. The price paid for picking is by the 100 pounds, and varies from time to time and in different sections, being governed by the supply of labor and the market price of cotton. In Georgia 50 to 60 cents may be the ruling price while in Texas during the same season it may be $1 or more. Expert hands pick from 250 to 300 pounds a day, but the average for the whole country will hardly exceed 125 pounds per hand. There is a record of a 16-year-old Texas girl picking 603 pounds in one day, and of two Oklahoma boys averaging 1,100 pounds a day. The records of the United States Department of Agriculture, in an investigation of the comparative efficency of white and negro labor in the cotton fields, show that in 152 counties, with a negro population amounting to 75 per cent of the whole, the average picking per day was 111 pounds, whereas in 192 counties with a white population constituting 75 per cent of the whole, the average was 148 pounds. Higher prices are paid in Texas and Oklahoma for picking than elsewhere, due to the greater scarcity of labor. In recent years the ruling price for the whole cotton belt has been from 60 to 70 cents per hundred, but in 1917 the average was about $1.00 per hundred, due to the increased cost of labor. As indicating the vast sum expended for this item it cost the farmers of the South approximately $162,100,000 to pick the record crop of 1914.

Bolly Cotton.— After the fields have been cleaned of all cotton that can be picked by hand, there is always found on the plants a number of partially opened bolls the maturity of which has been prevented by frost. Until recently all such cotton was considered worthless. But the high price paid for the staple since 1905 has led to the invention of machinery for utilizing the unmatured bolls. These machines thrash out the seed cotton from the bolls, after the latter have been well dried, and the seed cotton is then passed to the gin and treated as the hand-picked cotton. The lint thus obtained is classed as "bolly cotton," and being of an inferior grade and staple sells for much less than hand-picked cotton. Its production is on the increase, but as yet is confined to Texas and Oklahoma, where the winter rainfall is much less than in the other States, and the high winds assist in drying out the frost-bitten bolls.

Yield.— The yield of a field of cotton depends upon a number of contingencies, among which may be mentioned the preparation of the soil, the care taken in the selection of seed, the proper use of fertilizers where the soil needs fertilization, the kind of cultivation the crop receives, the absence or presence of plant diseases and of insects, the character of the soil, and above all the weather. A good yield, or such as the land is capable of producing, may not be expected with slip-shod preparation and cultivation, nor with insufficient nor misapplied fertilizers. Diseases of the plant, such as root rot, anthracnose, blight and shedding of the fruit sometimes greatly reduce the yield. Some insects, such as cut worms, caterpillars, boll worms, are at times very destructive, while the boll weevil, ever present when the fields once become infested, has under favorable conditions for its propagation destroyed as much as one-half the crop. Another pest, said to be just as destructive as the boll weevil, is the pink boll worm which has just made its appearance in the extreme southeastern counties of Texas. It is supposed to have been introduced from Mexico, into which country it was introduced in 1911 from Egypt, which is said to be its original habitat. Adverse weather, such as to give the crop a late start, or droughts in August, or early October frosts may materially affect the yield. The average yield per acre for 10 years (1906 to 1915, inclusive) in each State, beginning with Virginia and going westward, is as follows (in pounds): Virginia 228.4, North Carolina 243.5, South Carolina 224.1, Georgia 194.2, Florida 123.1, Alabama 173.6, Mississippi 192, Louisiana 174.3, Texas 170, Arkansas 190.9, Tennessee 197, Missouri 286.6, Oklahoma 174.4, California 482, and for all States 186.3 pounds. The higher yield in the Atlantic States is due to a more liberal use of fertilizers and to a more general practice of intensive culture. There are records of occasional extraordinary yields in some sections, for instance, 15,100 pounds of seed cotton on five acres of well-fertilized pine-wood land in Wayne County, N. C.; 10 bales on four acres in Marion County, S. C.; 12 bales on four acres in Pamlico County, N. C.; and five bales, weighing 500 pounds each, on one acre of highly fertilized sandy soil in Washington County, N. C.

Ginning.— Cotton ginning in recent years has become a distinct business. The ginneries are divided into three general classes, namely, those conducted exclusively for the public, those conducted exclusively for the plantation and those conducted for both the public and the plantation. The plantation ginneries constitute about 17 per cent of the whole. The modern up-to-date automatic ginnery practically does away with labor, and yields from 5 to 10 times as much lint cotton per day as was possible by the old method. A four-gin establishment of 40 saws each when in constant operation will turn out 40 to 60 bales of cotton per day. Of the 24,418 active ginneries in 1914, 21,045 used steam power, 1,069 water power, 1,922 gasoline power, 342 electric power and 40 animal power. During this year cotton was ginned in 897 counties. The competition of the ginneries is so sharp that charges for ginning have been considerably reduced. It used to be $1 per hundred or $5 a bale. Now it is about $2 a bale where the ginner furnishes the bagging and ties, or $1 a bale where the farmer furnishes both, the farmer taking all the lint and seed. Formerly the farmer furnished the bagging and ties and the ginner got all of the seed for ginning, now the ginner when the seed is taken also furnishes bagging and ties. It has become a very general practice, and this obtains particularly among small farmers and tenants, to sell the whole crop (in the seed) to the ginneries, the ginner paying one-third the market value of cotton. Before running it through the gin the seed cotton should be thoroughly aired and dried, then stored so that the lint may absorb some of the oil in the seed, though this practice is not generally resorted to. It should then be passed through the "whipper" to beat out the dust, sand and other trash, and thence to the gin which separates the lint from the seed. In ordinary seasons the lint cotton as it comes from the gin ought to weigh about 33⅓ per cent of the weight of the seed cotton. In other words one-third should be lint and two-thirds seed, or 1,500 pounds of seed cotton should turn out a 500-pound bale of lint. But this depends upon whether the crop is early or late, whether the rainfall has been deficient or excessive, and also upon the fertility of the soil. Sometimes the proportion falls below and sometimes exceeds 33⅓ pounds. Better seed selection, and improved methods of ginning, have now increased this proportion to about 35 per cent. After being ginned the lint cotton is passed into the press and packed in bales averaging each about 500 pounds gross weight, that is, including the bagging and ties, each bale being covered with six yards of bagging weighing 2½ pounds to the yard, and bound with six iron or steel ties weighing about seven pounds. The average or standard size bale is 24x54 inches. Though 500 pounds is the accepted average weight of a bale, the weight differs in nearly all of the States. In the Carolinas the average gross weight (i.e., including bagging and ties) is about 478 pounds, in Georgia 491, in Alabama, Mississippi and Louisiana 506, in Arkansas, Tennessee and Oklahoma 510, while in Texas it is about 520 pounds, the bales averaging heavier going from East to West. The average gross weight for all States is about 505 pounds.

An Old Time Gin House and Screw Press

Since the advent of the boll weevil cotton is not only planted earlier, but earlier maturing varieties are used. This has almost doubled the amount of cotton ginned in July and August, as compared with former years, and has led to fixing upon 1 August as the beginning of the commercial crop year instead of 1 September as heretofore. The average proportion of the crops of the past four years picked and ginned in July and August is 4.8 per cent; to 25 September, 22.6 per cent; to 1 November, 63.7 per cent; to 1 December, 84.8 per cent; to 1 January, 93.5 per cent; the remaining 6.5 per cent being ginned within the next two or three months.

Cost of Production.— It is impossible to ascertain with any degree of accuracy the cost of production. So much depends upon the quality of the soil, the thrift of the farmer, the efficiency of labor, the character of the season, the freedom of the crop from plant diseases and insect depredations, the price realized for the crop, that the cost will vary from year to year, and vary even in fields on the same plantation. Two elaborate investigations of the subject made by the United States Department of Agriculture will serve to illustrate the wide difference in cost, and also the increased cost in recent years. The results of the first investigation made in 1896 show that the average total cost of cultivation per acre was $15.42, and the average total return $19.03, leaving a net profit of $3.61 per acre. The average yield per acre was 255.6 pounds of lint, and the average price 6.7 cents per pound. The average cost of production in all States was 5.27 cents per pound. To produce a bale of 500 pounds the cost was $30.15. The results of the investigation in 1910 indicated that the average total cost per acre was approximately $20.35, and the yield of lint per acre 247 pounds, making the average cost of production in all States 8.30 cents per pound. The cost in 1910 was 32 per cent greater than that of 1896. In comparing the various items of cost this is readily accounted for. For instance the cost of plowing increased from $4.12 to $6.36, picking from $3.37 to $4.67, and rent of land from $2.88 to $3.56 per acre. The average cost in all States of the chief items in 1910 were: rent $3.56, preparation of the land $2.17, fertilizers $2.46, seed 51 cents, planting 50 cents, cultivation $4.19, picking $4.67, ginning $1.61, miscellaneous 68 cents; total per acre $20.35. The estimated cost per pound in the different States was: North Carolina 8.22 cents, South Carolina 8.07 cents, Georgia 8.48 cents, Alabama 7.92 cents, Louisiana 8.09 cents, Texas 8.59 cents, Arkansas 8.20 cents, Tennessee 8.19 cents, Oklahoma 8.44 cents and all States 8.30 cents. The Watkins Statistical Bureau of New York City in January 1918 concluded an exhaustive investigation of the cost of cotton production in 1917. In their introductory remarks they say: "that the cost of producing a pound of cotton varies from year to year. Not only so, but it varies in each State, in each county, and indeed the cultivated fields on the same plantation may produce varied results." As evidence of the very wide variation at different periods, the cost as ascertained by the United States Department of Agriculture in 1896 and in 1910 are cited, the first being 5.27 a pound in the former and 8.30 cents in the latter season, as compared with 11.28 cents in 1917, as estimated by the Watkins Bureau. The average cost of production and the net profit per acre as estimated by this authority are as follows: Virginia, cost $50, profit $39.75; North Carolina, cost $46.41, profit $34.61; South Carolina, cost $46.94, profit $48.20; Georgia, cost $37.15, profit $33.31; Florida, cost $26.81, profit $26.29; Alabama, cost $30.34, profit $22.47; Mississippi, cost $33.10, profit $30.17; Louisiana, cost $34.42, profit $46.63; Texas, cost $28.11, profit $25.88; Arkansas, cost $38.89, profit $35.51; Tennessee, cost $30.71, profit $22.73; Missouri, cost $39.08, profit $34.29; Oklahoma, cost $29.20, profit $26.82; California, cost $52.72, profit $70.40; Arizona, cost $94.42, profit $63.20; New Mexico, cost $31, profit $40.25; average cost for all States, $34.76, and average net profit per acre $31.55.

The net cost of producing a pound of cotton in each State is estimated as follows: Virginia, 13.10 cents; North Carolina, 13.08 cents; South Carolina, 9.85 cents; Georgia, 11.33 cents; Florida (partly long staple Sea Island), 17.74 cents; Alabama, 12.99 cents; Mississippi, 11.42 cents; Louisiana, 9.94 cents; Texas, 11.07 cents; Arkansas, 11.42 cents; Tennessee, 12.14 cents; Missouri, 12.35 cents; Oklahoma, 10.21 cents; California, 9.70 cents; Arizona, 41.74 cents (high cost due to high cost of irrigation); New Mexico, 7.11 cents; net cost per pound for all States, 11.28 cents. The extraordinary profits per acre are due to the very high prices obtained by the farmer for his lint cotton, and its by-product the seed, the former averaging 27½ cents a pound, and the latter $1 per bushel — prices the like of which have not been realized since 1870.

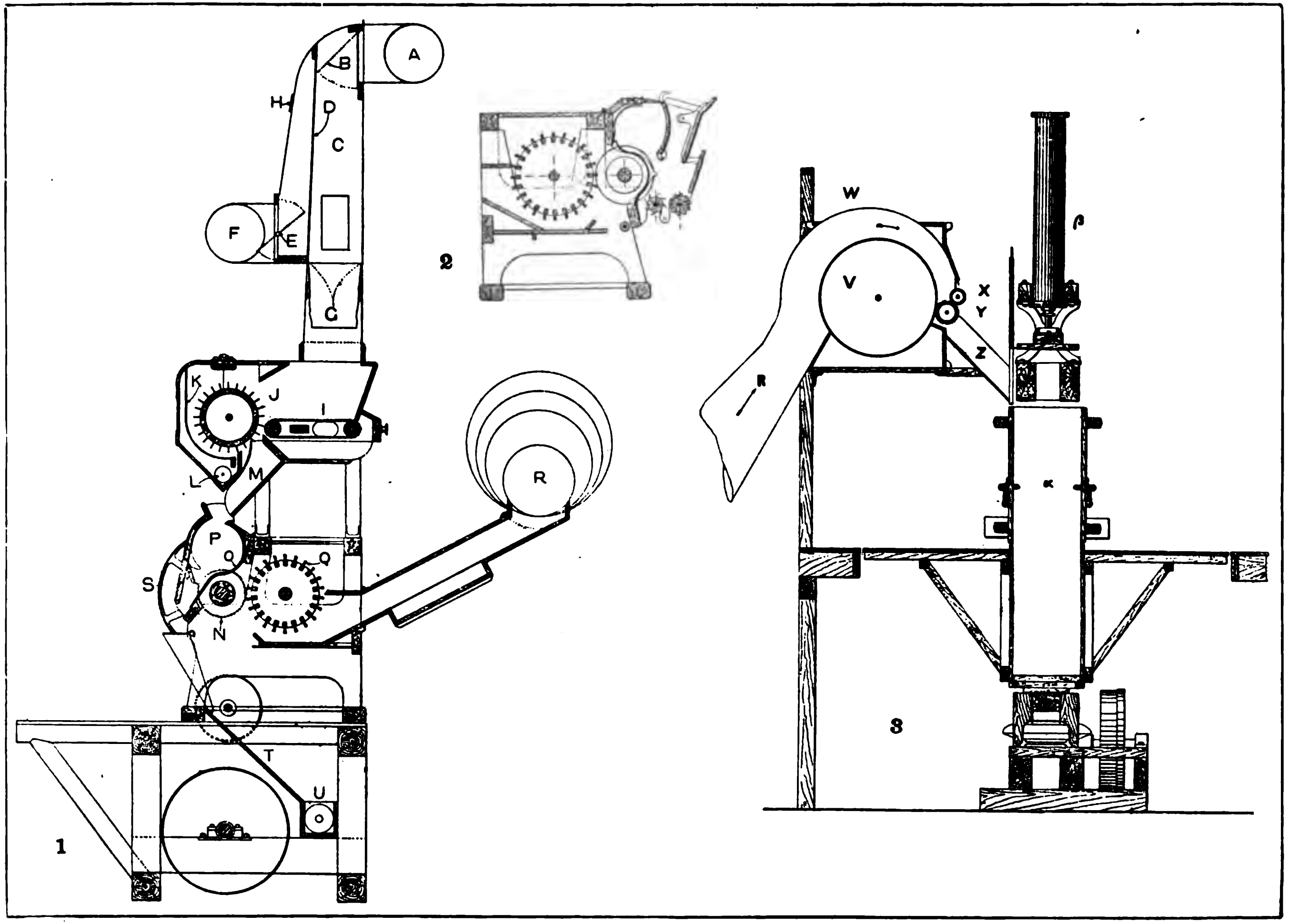
Marketing.—Cotton is the most marketable of all farm products. Non-perishable, and put up in conveniently handled bales, always in

COTTON RECEIVED AT, EXPORTED FROM, AND STOCKS AT UNITED STATES PORTS

Ports	In thousands of bales								
	Receipts			Exports			Stocks July 31		
	1916–17	1915–16	1914–15	1916–17	1915–16	1914–15	1916–17	1915–16	1914–15
Galveston	2,641	2,425	4,002	1,601	1,693	2,967	103,000	63,171	114,537
New Orleans	1,541	1,414	1,810	1,037	1,256	1,538	163,000	105,803	139,172
Mobile	113	163	167	76	82	90	8,000	14,052	12,477
Savannah	908	1,043	1,760	453	453	1,270	62,000	66,306	63,756
Charleston	174	264	406	19	85	261	6,000	21,927	43,211
Wilmington	88	221	279	81	171	203	48,000	56,549	34,903
Norfolk	544	681	646	108	82	75	59,000	34,348	47,693
Baltimore	128	57	82	170	168	67	26,000	2,000	1,000
New York	38	*34	*30	786	747	482	59,000	105,375	236,189
Boston	103	89	88	155	101	111	9,000	10,698	14,112
Philadelphia	26	6	11	43	26	35	3,000	1,125	725
Pensacola	37	70	87	37	65	87	1,000	5,298	40
Brunswick	154	151	217	113	113	199	24,000	2,136	284
Other ports	42	....	....	....	1,009	984	....	....	....
Newport News†	13	76	145	1	....	....	....	....	....
Port Arthur†	279	59	57	....	....	....	....	....	163
Pacific ports†	519	653	468	589	....	....	15,000	35,567	14,236
Texas ports†	2	331	512	266	....	....	10,000	8,906	13,847
Jacksonville	57	43	33	....	....	....	....	1,027	....
Georgetown	....	1	2	....	....	....	....	....	....
Total	7,407	7,783	10,802	5,533	6,051	8,369	596,000	534,288	736,345

* Net receipts only. Gross receipts at New York 1915–16, 1,630,000, 1914–15, 1,728,000 bales.
† Export included in other ports.
N. B.— The apparent discrepancy between receipts, exports and stocks at some of the ports is accounted for by the fact that they not only reship cotton to interior points, but coastwise to other United States ports.

COTTON GINNING MACHINERY



1 Vertical cross section of elevator, feeding, plain gin flue and platform 2 Cross section of Huller gin 3 Vertical cross section of condenser and press

demand, it finds a ready sale anywhere and at any time. But the old time method of consigning the crop to a commission merchant to be sold at the discretion of the planter is no longer followed except by a few large planters. Railroads traverse so much of the cotton territory that markets are convenient, and buyers are always on hand to pay cash for every bale offered for sale, thereby saving the farmer the cost of freight, cartage, storage, insurance and commissions for selling. If the cotton is carried to market and the price is not satisfactory it may be stored in a warehouse, weighed, marked for identification and a receipt issued for it that may be negotiated at any local bank at a reasonable rate of interest. In marketing his crop the farmer now has the advantage of selling it according to the grades established by the government. Heretofore, the grading was done by the buyer and the farmer knew little or nothing of the grades or their values. The cotton mills of the South are now consuming about 23 per cent of the total production, a considerable proportion of which is bought by the mills from farmers in the locality where it is produced. The remainder of the crop is nearly all marketed at interior points and from thence, after being compressed into smaller bales, is shipped either to Northern mills, or to the seaboard and through inland ports to various foreign destinations. In the general distribution of the crop about 23 per cent is taken by Southern mills, 20.5 per cent by Northern mills, and 56.5 exported. The largest amount of cotton exported in any year was in 1911–12, when 11,070,000 bales were taken by foreign countries. Of this Great Britain took 39 per cent, Germany 28.5 per cent, France 11 per cent, Italy 6 per cent, Japan 4 per cent, Spain 3 per cent and various other countries the remaining 8.5 per cent.

Grades.— The cotton grown in this country may be divided into three kinds: long staple sea island, long staple upland and short staple upland. The long staple sea island of South Carolina ranges from 1⅛ to 2¼ inches in length, is silky, fine, strong and clean and is used in making doubled or ply yarns from 150s to 400s; the Florida and Georgia sea island ranges from 1¼ to 1¾ inches, is silky and clean, and is spun into lower grade sea island yarns from 150s to 200s. The grades of sea-island are extra fine, fine, medium fine, good medium, medium, common and ordinary. The long staple upland, such as the Allen, Peeler, benders or the bottom land cottons of Mississippi and its tributaries, as well as those classed as Gulf or New Orleans, is from 1 to 1¼ inches in length, and is used in making yarns from 50s to 70s; the shorter staple upland ranges from ¾ to 1 inch, is easily manipulated and is suitable for weft or filling yarns from 30s to 40s. To classify cotton with the view to determine its market and spinnable value requires long practice and skilful use of hand and eye. The points to be determined are the grade, the staple, the color, the amount of sand and trash, the amount of dampness and whether or not the cotton is even running. When these are determined from samples drawn from each bale, the cotton is classified under one or the other of the nine standard grades established by the government. These grades consist of middling as the basis, and above this in the order named, strict middling, good middling, strict good middling and middling fair; below middling in the order named, strict low middling, low middling, strict good ordinary and good ordinary. These grades have been universally adopted in this country and now form the basis of all sales of cotton.

Cotton Exchanges.— The marketing and financing of the enormous crops of recent years have been greatly facilitated by the cotton exchanges. These exchanges bring together cotton dealers from all parts of the world, affording the foreign spinner and merchant the opportunity of buying cotton on short notice for future delivery. They give the domestic spinner and merchant, and the planter as well, the opportunity to purchase a contract or «hedge» as an insurance against market fluctuations that otherwise might result in loss. The manufacturer who has an order for the future delivery of goods may buy on the Exchange at a definite time and price a contract for the amount of cotton required to fill that order; the Southern merchant who has on hand a certain amount of cotton for which there is no immediate demand may sell on the Exchange a contract for a like amount, and hold his cotton until there is a demand for it; the planter whose cotton is not yet ready for delivery, seeing the market continually advancing, may sell on the Exchange a contract for a portion or all of his crop. In each case the transaction is an insurance against loss. Thus the Exchanges dispense with the old and costly custom of consigning and selling the crop through

The Cotton Exchange, New York

commission houses, and through its agency a very large proportion of the crop is sold at home and abroad at a minimum of expense to the producer.

The Cotton Exchange, Liverpool

Cotton Futures Act.—The Act of Congress, known as the Cotton Futures Act, became a law 18 Aug. 1914, and went into effect six months later, 18 Feb. 1915. The object of the Act is to regulate trading on the cotton exchanges in cotton for future delivery, by levying a prohibitive tax on such trading except where certain specified conditions are complied with. These conditions were determined with the view to correcting existing abuses, and are imposed upon parties to future contracts in order to equalize their privileges, and also to protect the rights of cotton owners, inasmuch as future contracts made on the exchanges control to a considerable extent the price of spot cotton in the Southern markets.

The first administrative duty imposed by the Act was the establishment of new official standards for cotton throughout the United States. On 15 Dec. 1914 the Secretary of Agriculture, therefore, established and promulgated new standards for nine grades of cotton — middling fair, strict good middling, good middling, strict middling, middling, strict low middling, low middling, strict good ordinary and good ordinary. Under the Cotton Futures Act the official cotton standards for the different grades are practically compulsory upon the exchanges in the United States, and they were compelled to adopt them in order to avoid excessive taxation, therefore the New York and New Orleans exchanges adopted the official standards for all transactions subsequent to 18 Feb. 1915. The use of the standards for other exchanges in the United States is optional; but 21 of such exchanges or similar organizations have adopted the standards and are making their quotations in conformity therewith.

Another duty imposed by this Act is the investigation and designation of bona-fide spot markets within the meaning of the Act. Thirteen cities have been named as such thus far, and ten of these are being used in establishing commercial differences for the settlement of future contracts, as required by the Act. By carefully prepared rules governing the making of price quotations, by frequent visits to the spot exchanges, and by telegraphic and mail reports from each exchange, it is undertaken to have the differences of the 10 designated markets accurately represent the true commercial values of the various grades, the average of which may be taken as a satisfactory basis for the settlement of future contracts.

Another important administrative duty under the Act is the settlement of disputes when they arise, as to the length of staple, grade or quality of any cotton tendered in settlement of a future contract, the Act requiring that future trading shall be on the basis of the official cotton standards. For the settlement of these disputes 12 expert cotton classers or "examiners" have been designated to act in these disputes, and their conclusions as to the grade, length of staple or quality are the basis of the formal findings of the Secretary of Agriculture, which are *prima facie* evidence in the United States courts as to the true grade, length of staple or quality, and tenderability of any cotton covered thereby.

Sea-Island Cotton.— Unless we except the small production of the West Indies, the cotton grown on the Sea Islands of South Carolina is the finest and most valuable in the world. The plant is larger and of a more vigorous growth than the upland plant, is less subject to disease and shedding of forms and bolls, and withstands adverse weather much better. There are over 5,000 farms on these islands, cultivated mostly by negro labor, many of which are owned by negroes. The farms are small, and the cultivation of the cotton so expensive that few farmers plant more than 100 acres. In preparing the land for cultivation the old stalks and weeds are knocked down and burned. The land is rarely ever broken up broadcast, but early in February two furrows are run with a single-horse turning plow in the old alleys, making a trench seven or eight inches deep. The trench is fertilized with about 20 cart loads of marsh mud and 1,000 to 1,400 pounds of cotton seed to the acre; or stable manure with composts of marsh mud and rushes are applied. Recently commercial fertilizers have come in general use, especially among the negro farmers who do not like the care and labor of making composts. One of the best fertilizers used consists of 250 pounds of acid phosphate, 200 pounds of kainit and 200 pounds of calcined marl per acre. After applying the manure the land is listed by using a hoe and pulling the soil on to the manure from the sides and tops of the old beds, or by covering the manured trenches with two furrows of a turning plow. A heavy roller is then run over the ground and the beds are afterward built up by lapping in two more furrows on a side with either a single or double-horse turning plow. The land is now ready for planting which is usually done the first 10 days in April. The seed are planted by three hands; the first one using a hoe opens holes 12 to 18 inches apart in the top of the bed, and the second hand follows dropping 8 or 10 seed in each hole, the third hand following and covering the seed with a hoe. About a bushel of seed to the acre is used. The seed come up in 8 to 12 days, and from the second week in April to the first week in May the plants are thinned out to a stand. The crop receives two hoeings in May, the plows then break out the middles between the beds, and they are followed by hoe hands who draw up the loose soil around the young plants. Cultivation with the hoe goes on continually until the last of July, by which time with one plowing in July and one in August to keep down the grass between the rows, the crop is laid by. The first blooms appear about the middle of June, and the bolls begin opening the latter part of August when the plants are four or five feet high. Picking begins from the last week in August to the second week in September, and is completed by the middle of December. When the cotton has been picked it is sun-dried and run through a "whipper" machine to knock out the dust and sand. A roller gin is always used in ginning sea-island cotton, as the saw gin cuts up and tears the fibre. The average yield per acre is about 125 pounds. The cost of production is just about twice that of upland cotton, all the items of expense, except rent, being much higher. The crop is not only more expensively fertilized, but it is much more difficult to pick owing to the smallness of the bolls and the tenacity with which the cotton adheres to the pods. In 1914 sea-island cotton was cultivated in two counties in South Carolina, 15 in Florida and 22 in Georgia. Climatic and soil conditions discourage its cultivation very far from the coast, as the fibre looses its lustre, strength and length, and to retain these characteristics the inland planters find it necessary to obtain fresh seed from the sea islands every two or three years. The largest crop ever produced was in 1905, when South Carolina made 13,714 bales, Florida 33,635 and Georgia 76,440; total 123,789. The average weight of bales is about 355 pounds in South Carolina, 375 in Florida and 407 in Georgia.

Long Staple Upland.— The long staple upland cotton such as Allen, Peeler and benders, until recent years was produced almost exclusively in the Mississippi Delta. The advent of the boll weevil which was found to be particularly destructive to this variety, on account of its late maturity, has induced the cultivation of the early maturing varieties of uplands, and the long staples for which there is always a great demand have been introduced in other sections of the cotton belt not infested with the weevil. Before the weevil spread over the Delta lands the total annual production of long staple was between 300,000 and 400,000 bales. At the present time the production in this section has been reduced fully one-half. In addition to the Delta lands in western Mississippi, eastern Arkansas, northeastern Louisiana and western Tennessee which produce long staple, in recent years this variety has been cultivated on the Red River or its tributaries in southwestern Arkansas and northeastern Texas, and in the counties of Darlington, Chesterfield and Marlboro in South Carolina, and a few sections in North Carolina, and a group of counties lying along the Savannah River in Georgia and South Carolina and a few isolated localities in other States. The total production in all sections in 1914 was a little in excess of 400,000 bales. The yield per acre of long staple is somewhat less than that of upland and the cost of production is greater, but this is more than offset by the price which is three to five cents higher than ordinary upland. Another variety of long staple cotton is cultivated in the Salt River Valley of Arizona from imported Egyptian seed. The staple is 1½ inches or more and is said to be superior to most of the Egyptian cotton used in this country.

Linters.— The increase in production of linters during recent years is noteworthy. From 114,544 bales in 1899, the output of this product increased to 1,300,163 bales in 1916. The 1915 linter product even exceeded that of the preceding year by nearly 112,239 bales, although the cotton crop of 1915 was very much smaller than that of 1914. This increase in linter production is due to some extent to closer delinting of the seed for the better separation of the meat from the hulls, but more especially to the high prices obtained for the fibre, which is used extensively in the manufacture of guncotton and smokeless powder. Many mills now obtain considerably more than 100 pounds of linters per ton of seed treated, whereas in earlier years 50 pounds per ton was a high yield.

The total quantity of bleached cotton fibre consumed in the United States during the calendar year 1915 in the manufacture of explosives was 121,331,385 pounds, equivalent to 244,003 bales of 500 pounds each net weight. During the three months ending 31 March 1916 there were consumed in this industry 144,988 bales and during the three months ending 30 June 1916 142,725 bales. The increased use of cotton fibre in this industry is striking, the quantity consumed during the first half of 1916 being considerably in excess of the total for 1915. The quantity of prepared cotton held on 30 June 1916 by the manufacturers of explosives was 11,447,422 pounds, equivalent to 22,895 bales of 500 pounds each. This quantity compares with 28,933 bales on 31 March 1916 and 30,483 bales on 31 Dec. 1915. The loss in bleaching cotton for nitrating purposes varies considerably, depending on the condition of the raw fibre, some stock being quite clean and some very trashy. From the information at hand it would appear that the loss in preparing linters from the wrapped and iron bound bales to the purified fibre as used in nitration is from 30 to 40 per cent. Based on an average loss of 35 per cent the gross weight of cotton fibre used in the manufacture of explosives was 375,000 equivalent 500 pound bales in 1915, 223,000 bales for the first and 220,000 for the second quarter of 1916.

Sea-island cotton, of which 91,844 running bales were ginned in 1915, represented in that year less than 1 per cent of the total cotton produced. All this cotton was grown in Georgia, Florida and South Carolina, the first-named State producing 57,572 bales, or more than three-fifths of the total.

Although cotton is grown in 18 States, the combined product of four — Texas, Georgia, South Carolina and Alabama — represented nearly two-thirds of the total crop of 1915.

Texas alone produced 3,227,480 bales, or more than one-fourth of the total crop of 1915.

The next greatest production was that of Georgia, 1,908,673 bales, or more than one-sixth of the total. Other States producing large crops were South Carolina, with 1,133,919 bales; Alabama, 1,020,839 bales; Mississippi, 953,965 bales; Arkansas, 816,002 bales; North Carolina, 699,494 bales; and Oklahoma, 639,626 bales.

Production by States.— The amount of cotton ginned in each State for the past 10 years, according to the United States census, is as follows, the running bales or the weights of bales as they are turned out at the gin being reduced to bales of the uniform gross weight of 500 pounds to the bale:

COTTON CROPS OF EACH STATE, IN BALES OF 500 POUNDS, GROSS WEIGHT.

STATE	1916–17	1915–16	1914–15	1913–14	1912–13	1911–12	1910–11	1909–10
Virginia......	27,127	15,809	25,222	23,490	24,398	29,891	14,815	10,095
N. Carolina..	654,603	699,494	930,631	792,545	865,653	1,075,826	706,142	600,606
S. Carolina...	931,830	1,133,919	1,533,810	1,377,814	1,182,128	1,648,712	1,163,501	1,099,955
Georgia......	1,820,939	1,908,673	2,718,037	2,316,601	1,776,546	2,768,627	1,767,202	1,804,014
Florida......	41,449	47,831	81,255	58,695	52,760	83,388	58,949	54,011
Alabama.....	533,402	1,020,839	1,751,375	1,495,485	1,342,275	1,716,534	1,194,250	1,024,350
Mississippi...	811,974	953,965	1,245,535	1,310,743	1,046,418	1,203,545	1,262,680	1,083,215
Louisiana....	443,182	341,063	449,458	443,821	376,096	384,597	245,648	253,412
Texas........	3,725,700	3,227,480	4,592,112	3,944,970	4,880,210	4,256,427	3,049,409	2,522,811
Arkansas.....	1,134,033	816,002	1,016,170	1,072,846	792,048	939,302	821,233	713,463
Tennessee....	382,422	303,420	383,517	379,471	276,546	449,737	331,947	246,630
Missouri.....	62,699	47,999	81,752	67,105	55,691	96,808	59,633	45,141
Oklahoma....	823,526	639,626	1,262,176	840,387	1,021,250	1,022,092	923,063	544,954
All others....	55,303	35,700	63,880	32,513	11,402	17,215	10,144	2,292
United States	11,449,930	11,191,820	16,134,930	14,156,468	13,703,421	15,692,701	11,608,616	10,004,949

Statistical Summary.— The following table is a statistical summary of the cotton crops of the United States in 10-year periods from 1800 to 1900 — annually since the latter year — and shows the area harvested since 1870 (the government collected no acreage statistics prior to this date), the production in running bales, the value of the crop (not including seed), the domestic consumption, the number of bales exported, the amount of stocks carried over at the close of the season (not including mill stocks), the average net weight of bales and the average price of middling uplands:

COTTON STATISTICAL SUMMARY, 1800 TO 1915.

YEAR	Area harvested acres	Production running bales	Value of crop in dollars	Domestic consumption running bales	Exports running bales	Stocks on hand close of the year	Average net weight of bales	Average price of middling per lb., New York
1916...........	35,994,000	11,363,915	$1,146,102,000	7,658,207	5,739,009	2,724,800	490	18.41
1915...........	31,412,000	11,068,173	628,000,000	7,278,529	6,191,110	1,670,570	480	11.2
1914...........	36,832,000	15,905,840	591,130,000	6,009,207	8,544,563	1,784,919	485	7.3
1913...........	37,089,000	13,982,811	885,350,000	5,884,733	8,914,839	896,617	484	12.5
1912...........	34,283,000	13,488,539	786,800,000	5,786,330	8,800,966	870,280	486	11.5
1911...........	36,045,000	15,553,073	749,890,000	5,367,583	10,681,758	906,239	483	9.6
1910...........	32,403,000	11,568,334	809,710,000	4,704,978	7,781,414	832,840	480	14.0
1909...........	32,044,000	10,072,731	688,350,000	4,798,953	6,339,028	506,808	475	14.3
1908...........	32,444,000	13,086,005	588,810,000	5,240,719	8,574,024	576,488	484	9.2
1907...........	31,311,000	11,057,822	613,630,000	4,539,090	7,573,349	641,874	480	11.5
1906...........	31,374,000	12,983,201	640,310,000	4,984,936	8,503,265	497,829	489	10.0
1905...........	26,117,153	10,495,105	556,830,000	4,909,279	6,763,041	668,668	482	10.9
1904...........	30,053,739	13,451,337	561,100,000	4,445,650	8,768,125	657,747	478	8.7
1903...........	28,016,893	9,819,969	576,500,000	3,963,981	6,109,755	111,799	480	12.2
1902...........	27,114,103	10,588,250	421,688,000	4,160,961	6,765,953	162,040	481	8.2
1901...........	27,220,414	9,582,520	438,015,000	3,988,501	6,715,793	163,586	489	8.1
1900...........	25,758,139	10,102,102	494,568,000	3,588,501	6,639,931	239,324	480	9.3
1890...........	20,809,000	8,652,597	430,380,000	2,632,023	5,783,101	228,684	473	8.6
1880...........	15,475,000	6,605,750	356,525,000	1,938,937	4,589,346	218,043	460	11.3
1870...........	9,985,000	4,352,317	299,850,000	1,110,196	3,169,009	144,290	442	17.0
1860...........	No Data	3,849,469	238,706,000	843,740	3,127,568	83,127	477	13.0
1850...........	" "	2,454,442	123,557,000	485,614	1,988,710	128,304	416	12.1
1840...........	" "	1,634,954	61,196,000	297,288	1,313,500	72,479	394	9.5
1830...........	" "	1,038,847	34,365,000	182,142	773,000	119,000	341	9.7
1820...........	" "	647,482	25,737,000	142,200	449,257	No Data	278	14.3
1810...........	" "	269,360	12,401,000	57,239	208,950	" "	297	15.5
1800...........	" "	210,526	21,120,000	39,474	91,716	" "	228	44.0

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COTTON CULTIVATION IN OTHER COUNTRIES. East India.— Next to the United States East India is the largest cotton producing country in the world. The plant is cultivated to a greater or less extent in nearly every presidency or province, extending from the North West Frontier province in the extreme north to the Madras presidency in the extreme south, and from the Bombay presidency on the western coast to the farthest confines of Assam and Burmah where they unite with China and Siam in the East. The sections of India where the bulk of the crop is raised embrace four principal cotton regions: the valley of the Ganges, the Deccan, western India and southern India.

Although the area devoted to cotton in recent years is immense—25,000,000 acres in 1914, or more than two-thirds of the American area—yet the yield per acre is barely one-third of the average yield in the Southern States, that of India being 80-85 pounds compared with 185-190 pounds in this country. There are plenty of good cotton lands throughout the empire, but their fertility is exhausted from many centuries of cultivation. Fertilizers are never used and cotton is cultivated pretty much as it was a thousand years ago in the most primitive manner. Both the soil and climatic conditions in the several cotton-growing provinces vary more than in any other cotton country of importance. In some sections the rainfall is abundant, while in others it is so light as to necessitate irrigation. Nor are the seasons uniform, but vary considerably in the different sections; for instance, while cotton is being harvested in the northern provinces, in the extreme south the seed are being planted, and such is the variance of the seasons that cotton picking is going on somewhere in almost every month of the year. Thus, in the Bengals and Sindh the usual date of planting is from the middle to the end of June; picking begins in September and October and ends in December and January. In the Coompta and Dharwar districts planting time is from the middle to the end of August, while picking begins in February and March and ends in May and June. In the extreme South — the Madras presidency — planting begins in October and November which picking begins in April and usually ends during the month of June.

The native cottons of India have a very short, coarse fibre, from one-half to three-quarters of an inch staple, and are used in the manufacture of very low counts of yarn. There are, however, some varieties such as Hinghunghat from the Central provinces, Oomras from Berars in central India, Dhollerars from the Bombay presidency and Tinnevellys from the Madras presidency, the staples of which run from three-quarters to one and one-eighth inches and are used in turning out counts or numbers of yarn 24s and below, usually for weft or filling.

Although India has for centuries produced large quantities of cotton, from which the most beautiful and delicate fabrics were woven and sent to all parts of the world, it was not until the cotton famine brought about by the Civil War, 1861-65, that its raw product began to assume commercial importance. Prior to this period the average annual exports of raw cotton amounted to about 600,000 bales of 500 pounds; since then the exports have gradually increased until now fully 2,000,000 bales (of 500 pounds) are shipped annually from Bombay and other ports to foreign countries. In the distribution of the crop Great Britain takes about 2½ per cent, Japan and China 24 per cent, the continent of Europe 31 per cent, domestic manufacturing establishments 35 per cent and domestic hand machines 7½ per cent.

The following table will give an idea of the progress made in the cotton industry in British India 1870-1907. (The largely reduced acreage in 1915 was the result of the European War):

COTTON PRODUCTION (000's omitted).

YEAR	Area planted	In 500 lb. bales	Yield per acre	Domestic consumption (500 lb. bales)	Exports (500 lb. bales)
1916-17....	21.212	3,418	80	1,723	1,328
1915-16....	17,976	3,025	85	1,786	1,973
1914-15....	24,632	4,186	85	1,648	1,762
1913-14....	25,020	4,052	81	1,723	2,845
1912-13....	22,028	3,688	84	1,677	1,717
1911-12....	21,615	2,630	59	1,640	1,462
1900-01....	14,231	2,163	76	1,412	1,430
1895-96....	16,362	2,078	64	1,457	1,158
1890-91....	16,546	2,580	78	1,274	1,048
1885-86....	13,562	1,675	62	858	958
1880-81....	11,205	1,342	60	633	1,038
1875-76....	11,675	1,305	56	490	1,045
1870-71....	......	1,274	......	425	1,180

NOTE.— The Indian government's figures (converted into 500 lb. bales) have been used in the above table. It is a recognized fact, however, that the government's crop estimates are usually much smaller than the combined exports and domestic consumption. The East India bale averages about 400 pounds, but for comparative purposes they have been converted into bales of 500 pounds.

Egypt.— As is true of East India and other Eastern countries, cotton was grown in Egypt at a time antedating all historical records. It is now cultivated all along the Nile, from the Soudan to the Delta of this wonderful stream, but the rainfall is so light that no crops can be grown without irrigation, and the Nile is the only source of water supply. Irrigation works known as the "Barrage" a few miles north of Cairo were completed in 1863. In 1898 the government began the construction of two great dams across the Nile, one near Assuam and the other at Assiout. They were completed by 1906 and as a result the cotton acreage has increased by about 25 per cent. The area in the Delta country, however, has about reached its limit, and any increase hereafter must be looked for in the Soudan and the Upper Nile country. For hundreds of years a low grade cotton had been produced from the native plant and used in domestic manufactures, but a great impetus was given to the industry in 1821, when a new variety of seed was introduced from Abyssinia, and, again, cotton culture was still more greatly stimulated by the cotton famine caused by the American Civil War.

Egyptian cotton has a long, strong, silky staple from one and one-eighth to one and five-eighth inches in length, and in quality and value ranks next to our better grades of Sea Island which range from one and one-half to two and one-half inches in length. The best known varieties of Egyptian are classified as Mitafifi, Abassi, Joannovich, Ashmouni, Nubari, Sakellaridis and Afif Assil. About 18 per cent of the cotton area is devoted to the Mitafifi variety, 19½ per cent to Ashmouni, which is grown in Upper Egypt, 9 per cent to Nubari, about 46 per cent to Sakellaridis, and 7½ per cent to other varieties. The Sakellaridis, grown in Lower Egypt, is of recent origin and is considered almost as valuable as Sea Island. It is described as very clean and white, very lustrous, free from neps, the staple being fully one and five-eighths inches in length. Egyptian cotton is especially adapted for making sewing thread, fine underwear and hosiery, and for mercerising and other processes that give a high silky finish to cloths. Its capacity for taking dyes makes it valuable for mixing with silk and for filling sateens, India linens and similar highly finished goods. The brown color of the Mitafifi adapts it for use without dyeing in making balbriggan underwear and lace curtains in which the ecru shade is desired.

Preparations for planting the crop begin in February and March, and planting is carried on during March and April. Picking begins in September and is usually completed during the early part of December. To prevent the hibernation of boll-worms the law requires all cotton plants to be removed from the land before 1 January. Ginning is usually done at ginning establishments at interior towns, most of which are owned by cotton merchants and large exporting houses. The bales are packed by hydraulic pressure and average about 750 pounds each, but before being exported are rebaled and steam compressed at Alexandria.

As there are no cotton manufacturing establishments in Egypt practically the whole of the crop is exported. In the distribution of the crop for consumption in normal times Great Britain takes about 38.5 per cent, the United States 22 per cent, Germany 11 per cent, France 8.5 per cent, Russia 7.5 per cent, Austria 3.5 per cent, Switzerland 2.5 per cent and various other countries the remaining 6.5 per cent.

In the decade 1870–80 the crop averaged about 430,000 bales (500 lbs.) annually, in the decade 1880–90 the average increased to about 560,000. Since the latter period the crops have increased as more lands were brought under irrigation. By a government decree the cotton area in 1915 was considerably reduced on account of the European War. The following table will show the progress of the industry since the completion of the irrigation works.

COTTON STATISTICS FOR EGYPT, 1895–1915.

		Production	
YEAR	Acres planted	Bales (500 lbs.)	Average per acre (lbs.)
1917–18	1,677,000	No data	......
1916–17	1,655,000	1,158,000	350
1915–16	1,186,000	1,092,000	460
1914–15	1,822,000	1,384,000	380
1913–14	1,789,000	1,496,000	418
1912–13	1,787,000	1,492,000	417
1911–12	1,776,000	1,463,000	412
1910–11	1,664,000	1,506,000	453
1905–06	1,626,000	1,181,000	363
1900–01	1,277,000	1,077,000	422
1895–96	1,015,000	1,041,000	513

Russia.—Cotton production in the Trans-Caspia and the Trans-Caucasia has attained great importance since the occupation of that territory by Russia, so that now instead of depending upon the United States for its supply of cotton its own domains supply its mills with fully 60 per cent of the needed raw material. The great bulk of the crop is grown in Turkestan.

Cotton is grown in most of the river valleys, but its cultivation is limited to localities adapted to irrigation, as the climate is dry, very hot, with mild winters, and scarcely any rainfall during the crop-growing season. Some of the irrigation works were built centuries ago, but the Russian government has offered such encouragement to cotton culture that over 2,000,000 acres have been brought under irrigation, with the probability of this being considerably increased. Experiments have been made with a number of imported seeds, but the Upland American have given the best results and a large proportion of the present growth is either of American varieties, or varieties developed from this seed. The staple is about an inch in length, of a smooth good color and clean. The indigenous varieties are about an inch staple, of good color, but rough. In 1890 the cotton crop of Asiatic Russia so far as known had never exceeded 150,000 bales (of 500 lbs.), but in 25 years, owing to the building of irrigation works and the extraordinary duty imposed upon foreign cotton (amounting to $2.06 per 36.1 pounds), the production increased to 1,387,000 bales, or 825 per cent. Russian cotton manufacturers are said to believe that it is possible to meet the full requirements of the Russian industry with cotton of domestic production, and that produced by countries under Russia's economic influence. Recent surveys have shown that enormous areas of land well suited for cotton could be irrigated in the lower basin of the Amu-Daria River.

The average weight of bales in central Asia is about 300 pounds, and in the Caucasus 350 pounds. The ginning and baling is performed practically in the same manner as in America. The bales are covered with heavy jute wrapper, held in place by four wires, thus guaranteeing the proper protection of the bales.

The following table shows the area planted in cotton and the production (reduced to bales of 500 lbs.) for four seasons in each of the provinces of central Asia and Trans-Caucasia:

RUSSIAN COTTON ACREAGE AND PRODUCTION (000's OMITTED).

PROVINCES CENTRAL ASIA	Acreage				Production (500 lb. bales)			
	1915–16	1914–15	1913–14	1912–13	1915–16	1914–15	1913–14	1912–13
Ferghana	908	776	739	722	668	591	549	502
Samarkhand	150	96	85	77	112	93	69	58
Sir-Daria	200	199	182	183	104	93	81	70
Bokhara	273	178	178	221	187	171	105	89
Khiva	120	70	70		101	92	50	38
Trans-Caspia	155	152	123	89	90	82	63	70
Total	1,806	1,471	1,377	1,292	1,262	1,122	917	827
TRANS-CAUCASIA								
Erivan	97	108	102	109	45	52	50	50
Elizabethpol	129	143	135	144	43	48	47	48
Baku	52	75	54	64	29	32	12	10
Tiflis	13	15	13	14	6	7	4	4
Kutais	5	5	5	7	2	2	1	1
Total	296	346	309	338	125	141	114	113
Grand total	2,102	1,817	1,686	1,630	1,387	1,141	1,031	940

China.— There are no records showing how largely cotton has been cultivated in China, but it is known that about 1300 A.D. the native fibre began to be extensively used. Since that period its growth and manufacture have reached immense proportions. The Chinese keep no statistics whatever, and it was not until very recently that any information could be obtained as to the amount of cotton produced. About 1895 the crop of China (including its dependency, Korea) was estimated at 1,600,000 bales of 400 pounds each. Recently, the Ministry of Agriculture of the Republic has estimated the annual production for the years 1909, 1910 and 1911 at 4,181,333 bales of 500 pounds each. The suppression of the opium trade, the rapid development of the cotton mill industry and high prices for the raw material have undoubtedly stimulated production in recent years.

The Chinese method of cultivation is very primitive. After the ground is plowed in March the seed are sown broadcast, and in consequence the plants grow up thickly and are so poorly developed that the bolls are small and the yield light. Some planting is done in hills or ridges, but this is carried on only to a limited extent. The staple of the Chinese cotton is short, averaging from one-half to three-fourths of an inch, is rough, but very clean. There are no extensive farms, most of the cotton being grown on patches and small tracts of one or two acres. The old Hindu churcka is generally used for separating the seed from the lint, and the spindle and hand loom for domestic manufactures, though modern cotton factories are now consuming more than a half million bales.

In 1906 the exports of cotton from China amounted to 205,000 bales (of 500 lbs.), in 1910 to 333,000 bales, and in 1915 to 142,000. The great bulk of the exports are shipped to Japan. An estimate from a reliable source places the amount of Chinese cotton from the crop of 1914 which entered into commercial channels at 1,750,000 bales of 500 pounds each.

Brazil.— Cotton is indigenous to the country, but its cultivation received comparatively little attention until the shortage caused by the American Civil War greatly increased the demand for all kinds of cotton. Fields of cotton, such as are to be seen in the United States and other countries, are unknown in Brazil. In the preparation of the soil all the planter has to do is to clean the land and plant the seed at the proper season. There is no breaking up the land, no preparation of the soil, no laying out of furrows and no cultivation except an occasional chopping out of weeds with the hoe. As a rule cotton is grown by the small farmer, who has little or no capital, in the most primitive and haphazard manner in connection with other crops. Several varieties are cultivated, the native tree cotton, which grows 7 to 10 feet high and bears well for two or three years, also several kinds of shrub cotton bearing only once a year. One of the latter varieties is from American seed. The lint is separated from the seed with the common hand roller gin, though the saw gin is used in some sections. A rude hand screw is used for packing the cotton in bales averaging about 280 pounds each. The staple of Brazilian cotton is from 1 to 1⅜ inches, is harsh, wiry, clean, creamy colored, and is good for making warp yarns for sizing. The principal states in which cotton is grown are Pernambuco, Ceara, Parahyba, Alagoas and Maranhao. The states of largest production are Pernambuco and Parahyba. In 1859–60 the cotton crop of Brazil amounted to about 70,000 bales, and in 1893–94 to 300,000. The crop of 1910–11 was 280,000 bales of 500 pounds each, that of 1912–13, 315,000, and that of 1914, the largest crop on record, 440,000. The largest amount of cotton exported in any one year was 346,000 bales in 1872. In recent years the exports have greatly decreased, owing to the increased consumption by domestic mills, which now consume about 80 per cent of the cotton crop. The possibilities of cotton production are said to be very great — in fact, that there is a sufficient amount of available land to produce 40,000,000 bales, allowing a yield of only 100 pounds to the acre.

Mexico.— Cotton is indigenous to this country, and though it was of the first importance before the Spanish conquest, there is now less cotton produced than under the Aztec monarchy, notwithstanding the fact that modern spinning mills not only consume all of the native product, but draw upon the United States for additional supplies. Cotton is grown in all the states along the two oceans and in the interior states of Chihuahua, Coahuila, Durango and Nuevo Leon. The famous Laguna district in Coahuila, with its rich alluvial deposits along the Nazas River from which the lands are irrigated, produces the largest crop. In this district it is the custom to replant every seventh year, though some planters gather cotton from plants 10 to 20 years old. The staple of Mexican cotton is about one inch in length and of a superior quality, particularly that of Vera Cruz, but the finest cotton, one and one-half inch staple, is grown at Acapulco in the state of Guerrero. The normal crop of Mexico is about 200,000 bales of 500 pounds each, but owing to the revolutionary uprisings in recent years the production has been gradually decreasing. The crop of 1913–14 is estimated at 150,000 bales, that of 1914–15 at 125,000, and that of 1915–16 at only 100,000. It has been officially stated that Mexico contains at least 8,000,000 acres that are particularly adapted to cotton culture.

Peru.— In Peru, as to nearly all Central and South American countries, the cotton plant is indigenous. The principal producing districts are located near the coast, and are irrigated by canals connected with the waters of the Andes. The soil is very fertile and yields from 325 to 500 pounds of clean cotton to the acre. The plant is perennial, growing from 10 to 15 feet high, and under favorable conditions will bear two crops for a number of years. Plants have been known to yield for 30 years, though the average fruit-bearing period is seven or eight years. The fibre is long, from 1¼ to 1½ inches, strong, rough, spiral shaped and admirably suited for mixing with wool, giving strength, lustre and finish to goods in which it is used, and is especially adapted for underwear and hosiery. While the production of cotton is comparatively small, it has increased rapidly in recent years. In 1892 the crop amounted to only 36,500 bales of 500 pounds each, and in 1809 to 107,316 bales. The production in 1913–14 was

176,000 bales, in 1914–15 152,000, and in 1915–16 160,000. The domestic mills consume about 12,000 bales annually in the manufacture of a coarse grade of cloth.

Turkey.— The principal cotton-growing regions of Turkey are on the Cicilian Plains in Adana, the Aidin district in Smyrna and other districts in Armenia, Palestine and Mesopotamia. During the cotton famine period, 1860–65, high prices stimulated production and as much as 240,000 bales (weight of bales unknown) were exported in 1865. Following the decline in prices the crops produced from 1870 to 1895 were small and of little commercial importance. A new impetus was given to cotton culture after 1895 and by 1912 the production reached 200,000 bales. The crop of 1914–15 was 195,000 bales, and that of 1915–16, 155,000. The largest crop, about 100,000 bales, is produced in Adana. (The weight of the bales differs so much in the various districts that no uniform weight can be given. The above figures are therefore in running bales).

Persia.— The cotton plant is said to be indigenous to this country, and thrives in almost any section where the soil is favorable and sufficient water can be procured for irrigation. The method of cultivation is of the simplest, and has continued almost unchanged from early times. Planting begins early in April and continues during the month. Harvesting begins the latter part of September and is finished by November. The lint is separated from the seed with the ancient hand-roller machine, while the bales are pressed by the feet and hands into packages varying from 100 to 220 pounds. The staple is a bright creamy color, strong and from $\frac{3}{4}$ to $1\frac{1}{16}$ inches in length. The product of the central, southern and south-eastern provinces is exported mostly to India, and that of the north, northwest and northeast to Russia. The latest available statistics place the Persian crop at 140,000 bales.

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COTTON EXCHANGES. See COTTON GROWING IN THE UNITED STATES.

COTTON FAMINE, the destitution caused by the outbreak of the American Civil War (1861–65) in the English cotton manufacturing districts, especially in Lancashire. The cotton supply failed on account of the blockade of the Southern ports of the United States, and in consequence the mill-owners finally closed their mills entirely, nearly 2,000,000 of people being reduced to great distress. A Cotton District Relief Fund was started, and a Relief Act passed by Parliament, by which loans were granted to the guardians of the poor for the purpose of instituting relief works. In 1863, in the midst of the war, three shiploads of provisions and supplies were sent to England from New York. Gradually the difficulties were overcome, and by June 1865 the distress was at an end, greatly increased supplies of cotton having been received from Brazil, Egypt, India and elsewhere.

COTTON GINNING. See COTTON GROWING IN THE UNITED STATES.

COTTON-GRASS, a genus (*Eriophorum*) of the sedge family (*Cyperaceæ*). About 10 species are distributed in bogs and moist places throughout the northern hemisphere. The fruit of the cotton-grass is clothed at the base with a silky or cotton-like substance, which has been employed in making paper and candle-wicking, also used for stuffing pillows. The plant was formerly used for medicinal purposes.

COTTON-GUM (*Nyssa aquatica*) belongs to the natural order *Cornaceæ*. Besides this species there are three others, natives of eastern North America. It is a large tree, which sometimes reaches the height of 100 feet, with a circumference of four feet, abounding in deep swamps and ponds from Florida to southern Virginia and westward to Texas, Missouri and Illinois. The wood of *N. aquatica* is soft, though hard to split, and of a light brown, nearly white color. It is also called tupelo-gum.

COTTON INSECTS. The cotton worm and boll-worm are the chief enemies of the cotton plant in the United States; in other countries different insects prey upon it. Various caterpillars and other insects attack this plant wherever it is grown. In Egypt a noctuid larva, in Greece various kinds of cut-worms, in India a small tineid boll-worm (*Depressaria*), while in Australia a red-bug, allied to the cotton-stainer (*Dysdercus suturellus*) affects it. This insect, by sucking the buds, causes the bolls to blast or become diminutive, and also stains the cotton fibre by its excrement.

The cotton worm is by far the most serious pest. It is the larva of a noctuid buff moth (*Aletia xylina*), which often feeds in vast numbers on the leaves of the cotton-plant. *Alabama argillacea* is a semi-looper caterpillar, has a loping gait; is slightly hairy, green, dotted with black along a subdorsal yellowish line, with black dots beneath. The insect, as shown by Riley, “never hibernates in either of the first three states of egg, larva, or chrysalis, and it survives the winter in the moth or imago state only in the southern portion of the cotton belt." "The moth," he adds, "hibernates principally under the shelter of rank wire-grass in the more heavily timbered portions of the South, and begins laying its eggs (400 to 500 in number) on the ratoon cotton when this is only an inch or two high." The localities where it hibernates, and where, consequently, the earliest worms appear, seem to be more common in the western part of the cotton belt (Texas) than in the Atlantic cotton States. It is inferred that from this region the moths emigrate east and north, laying their eggs later than the original Texan brood, as in Alabama and Georgia. The recently hatched worms of different sizes were found late in March on ratoon cotton in southern Georgia and Florida, and in late seasons from the middle of April to the middle of May, though they do not attract the attention of planters until the middle or last of June. In midsummer the period from hatching to the time when the moth lays her eggs is less than three weeks, but in spring and late autumn twice that time may be required. There are thus in the northern cotton States at least three "crops" or broods of caterpillars in a season, while in Texas there are at least seven annual generations. The first generation is only local, but in Texas, says Riley, "the third generation of worms may become, under favorable conditions, not only widespread, but disastrous, and the moths produced from them so numerous that they acquire the migrating habit. This generation appears in southern Texas during the latter part of June, and in southern Alabama and Georgia somewhat later," and this is the first brood which attracts general attention. When the worms are very abundant and the cotton well "ragged," the moths, driven by need of food and with favoring winds, migrate to distant points, and thus spread late in summer, having been seen as far north as Massachusetts and the Great Lakes.

Another insect, destroying great numbers of cotton buds, is the boll-worm, the caterpillar of another noctuid moth (*Heliothis armigera*), well known for its injuries to tomato and tobacco plants and to corn in the ear. The adult is a tawny, yellowish moth, about an inch and three-quarters across the wings, which may be seen toward evening, in summer and autumn, hovering over the cotton blooms, and depositing a single egg in each flower; the egg is hatched in three or four days, and the worm eats its way into the centre of the boll, causing its premature fall; the insect instinctively leaves the boll when it is about to fall and enters another, and finally attacks the nearly matured bolls, rendering the cotton rotten and useless. The caterpillars have 16 feet, and creep with a gradual motion, unlike the true cotton worm; they vary much in color, some being green, others brown, but all more or less spotted with black, and having a few short hairs. A single moth will lay 500 eggs, and as three broods are produced in a year, a whole field will be very soon infested with them.

These are the greatest enemies on the cotton plantations, and the same remedies are effectual in both. The natural enemies of the cotton worms are numerous and abound in proportion as the worms are abundant. Certain kinds of ants are most efficacious in reducing their numbers, as well as ground beetles, bugs and ichneumon flies (q.v.). The general and most practical remedies against this troublesome pest are the insecticides, especially Paris green and kerosene emulsions. The dry preparation is one pound of the green to from 20 to 35 pounds of cheap flour, or, instead of flour, land plaster (gypsum) or cotton-seed meal. The best preparation of Paris green consists of one pound to 40 gallons of water. London purple may be applied dry, using two pounds to 18 of flour, etc.; or wet, one-half a pound to 50 or 55 gallons of water.

A fine spray of kerosene oil applied to the leaves will kill all the worms in a remarkably short time, but as petroleum in any form injures the plant, the oil must be so diluted as to injure only the worm and not affect the plant. The use of milk as a diluent has been suggested.

In recent years the pink cotton boll-worm, long a pest in Egypt, has invaded the United States via Mexico, where it got a footing in 1911. In the latter country it is destroying from 50 to 75 per cent of the crop. It reached the country in two shipments of Egyptian cotton seed. Every lot of seed contained the eggs of the pink boll-worm, and in two years the pest had spread throughout Mexico. It is also present in about 3,000 acres of cotton land in Galveston and Harrison counties, Tex., where the State and Federal governments are now engaged in its extermination. The Congress appropriated $500,000 for the work. The method of extermination is radical. First the cotton stalks in the entire field are cut by a machine which covers about 22 acres per day. Then a rake goes over the field and places the stalks in rough piles. Next come handworkers who gather each little boll and piece of cotton and all other vegetation and put it on the pile. The whole is then burned, leaving a field cleared utterly of all vegetable and animal life. The moth which is the parent of the pink boll-worm is fragile and can fly no great distance. It is chiefly in the seed that it is transported, and the eggs can exist there for months. The worm damages the crop in many ways. In the field bolls fall to the ground and 50 per cent of the crop may be lost in this way. The grade of cotton is also damaged and the insect stains what cotton is produced. In addition oil production is lessened and the cotton seed is rendered unfit for planting and germinates poorly. Consult *Journal of Agricultural Research* for 4 June 1917, issued by the United States government; also Riley, 'Report IV' of the United States Entomological Commission (1885); and Bulletin 18 of the Entomological Division of the United States Department of Agriculture (1898). For cotton-boll weevil, see WEEVIL.

COTTON MACHINERY. Ginning machinery is always located at or near a railway station in a cotton-growing territory. The earliest cotton gin probably dates back to the days when the market price of animal skins became so great that man had to look around for a cheaper substitute for clothes. A primitive machine called the churka is an early gin. It is used to-day by the Hindus and Chinese. It consists of two plain rollers mounted on a frame and revolved in contact. Between these rollers the cotton is drawn and torn from the seed.

In most parts of the cotton belt of the

United States the saw-gin which Eli Whitney invented in 1794 is still the machine used to gin cotton. The purpose of the machine is to separate the seeds from the fibres of the cotton. Evolution has done comparatively little to change its three essential elements, the saws, ribs and brush. These have been retained in nearly all modifications intended to meet modern ideas, methods, means and material of construction, and improve the quality and quantity of the staple of the cotton, but thus far no machine has been invented which can excel the saw-gin in capacity. The cotton gin consists principally of a hopper in which the raw cotton is thrown. A blower-case and a rotary brush serve to guide the cotton against a cylinder which has needle-like teeth, or, in later construction, saw-teeth. These teeth catch the cotton fibre and withdraw it through openings too narrow for the seeds to follow. A seed-bar and screen remove the seeds, the dust is blown out and the separated or ginned cotton is ready to be baled. As the fibres of the cotton were found to be injured by the action of the saws, the McCarthy roller gin was introduced. It consists of a leather-covered roller to which a knife is tightly held tangentially and a moving blade that moves up and down in a plane just behind and parallel to the fixed knife. As the cotton is drawn between the rollers and the knife the seeds are forced loose by the moving blade. It works well, but its limited capacity has prevented its general introduction.

Until about 1875 the average ginning plant consisted of one gin stand having a gang of 60, 70 or 80 saws, capable of turning out from 8 to 10 500-pound bales of cotton in a day. The isolated cotton plantations did not require a greater capacity than this size of plant, and each planter did his own ginning. But after the development of the Southwest with its large areas capable of raising cotton and the large number of small farms located close together, system gins were erected at railroad stations capable of ginning for the entire neighborhood. The competition of the gins with each other required a perfection of machinery never attempted in the older portions of the cotton belt. As the development of the Southwest increased its competition with the Southeast, this latter section adopted the methods which had grown up in the former. Small plantation gins were not rebuilt as they wore out or burned, but larger gins owned by a company of planters or merchants were built at the railway stations. Thus the entire cotton handling business underwent a revolution, until, for economy, speed and efficiency, it ranks with the latest machinery for handling grain crops.

The constant danger of fire which hangs over all cotton gins has caused the separation of the different buildings which go to make a complete establishment. The gin building proper is only large enough for the machinery which does the ginning; no cotton is in the building except that which is undergoing the process of ginning. The seed house in which the seed is stored is usually located on a near-by spur of the railway. Further to avoid the risk of fire and to ensure better running of the machinery, the gins are located on a low platform three feet high. The floor of the building is brick or cement and the building is made of brick, stone or sheet iron.

The line shaft is carried directly under the gins where all of its journals are in sight; it can be easily oiled and hot-boxes instantly detected. At the end of the row of gins a higher platform is built to surround the press. Bales are taken out on this platform and can be thrown into the wagons thence without further expenditure of labor. After the mechanical processes of carrying by the exhaust fan and dropping the cotton into each gin, blowing it from the gins to the presses and its packing there by a steam tramper, the operation of putting on the bagging and tying the hoops is the first manual labor necessary after the feeding from the wagon into the telescope.

The principal machines used in a modern cotton ginning establishment, in the order in which they are used, are the telescope, the elevator, the exhaust fan, the feeder, the gin, the seed conveyer, the flue, the condenser and the press.

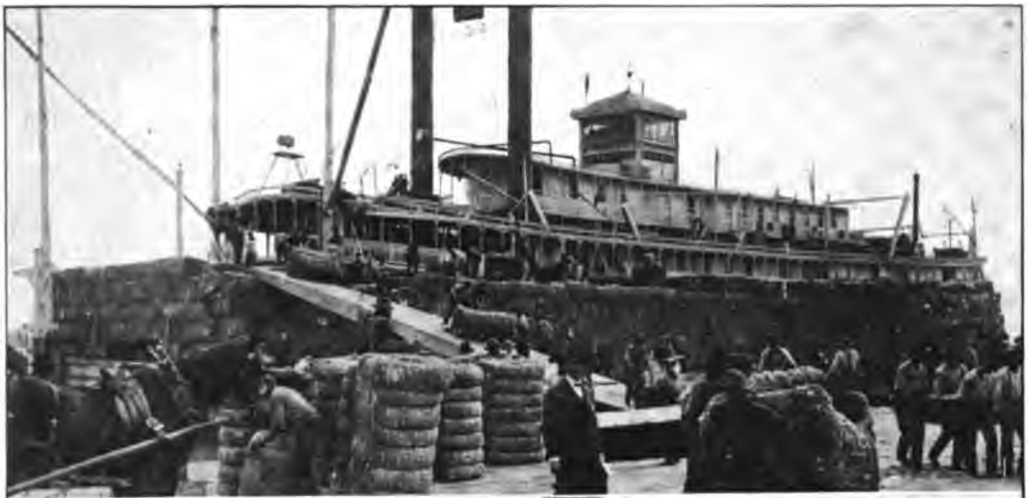
The telescope is an extensible tube which hangs from the inlet cotton pipe; it is counter-balanced and so arranged that its tube can be pulled down and kept close to the pile of cotton as it decreases in size. A pneumatic elevator is the apparatus generally used to distribute cotton to the gins. In a system using four gins each valve is open a fourth of the time and closed three-fourths. When the first air valve in the first chute is open a vacuum is formed in the chute, the outside air, carrying with it the cotton, rushes in from the telescope. The air is drawn through the screen into the fan, while the cotton strikes against the screen with enough force to take out a large part of dirt and dust, no cotton being ever allowed to get into the blades of the fan on account of the danger of fire. By shifting the valves another chute is opened and the stream of cotton and air is deflected to the second chute, and the cotton in the first dropped from the screen and into the feeder below.

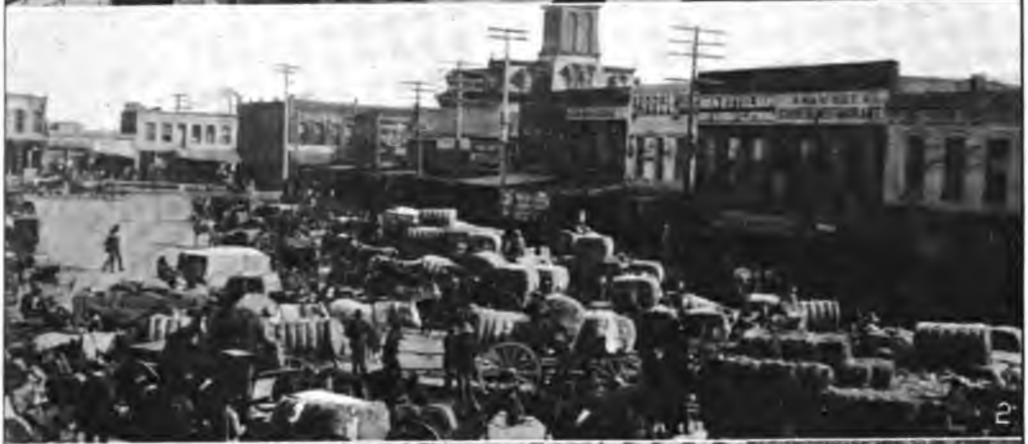
The feeder, which is over the gin, has for its object the cleaning of the seed cotton, breaking up the lumps and then feeding the locks evenly and regularly into the gin. A slowly moving apron receives the cotton from the elevator and carries it to the picker wheel. This wheel, revolving with great rapidity, picks up the locks of cotton and throws them against the screen. The particles of dirt and trash go through this screen and are carried away by a helical conveyer. The cotton is rubbed over the screen and thrown on an inclined apron, which carries it into the roll boxes of the gins.

The flue which conducts the cotton from the gins is made of sheet metal and shaped like a long funnel with the larger end near the condenser, which is located at the end of a flue and acts as a collector of the bunches of cotton that fly through the flue like snow and makes them into a bat or sheet of cotton. This bat of cotton drops down an incline into the press.

The press used in the square bale system of gins consists of two boxes mounted together on a turntable. Cotton from the condenser is allowed to drop into the first box and when enough cotton has been forced into it by the steam tramper, the turntable is revolved and the other box comes in its place. The loaded box comes into position over a ram where it receives the final pressure. This ram is operated by a large direct-acting steam cylinder, a

COTTON





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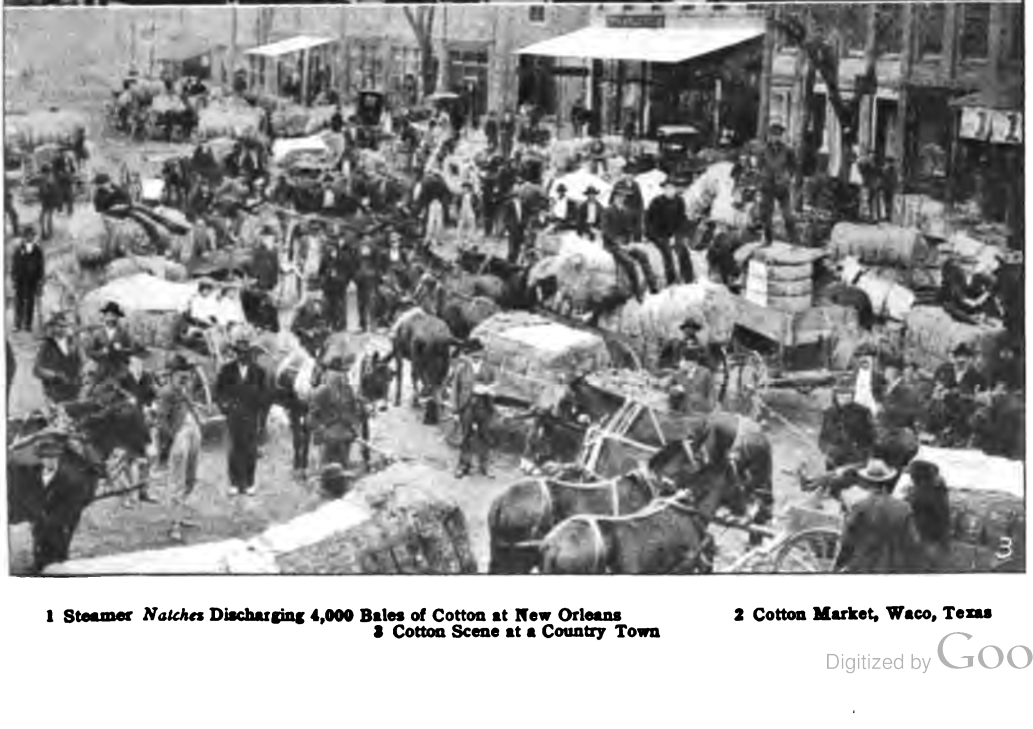

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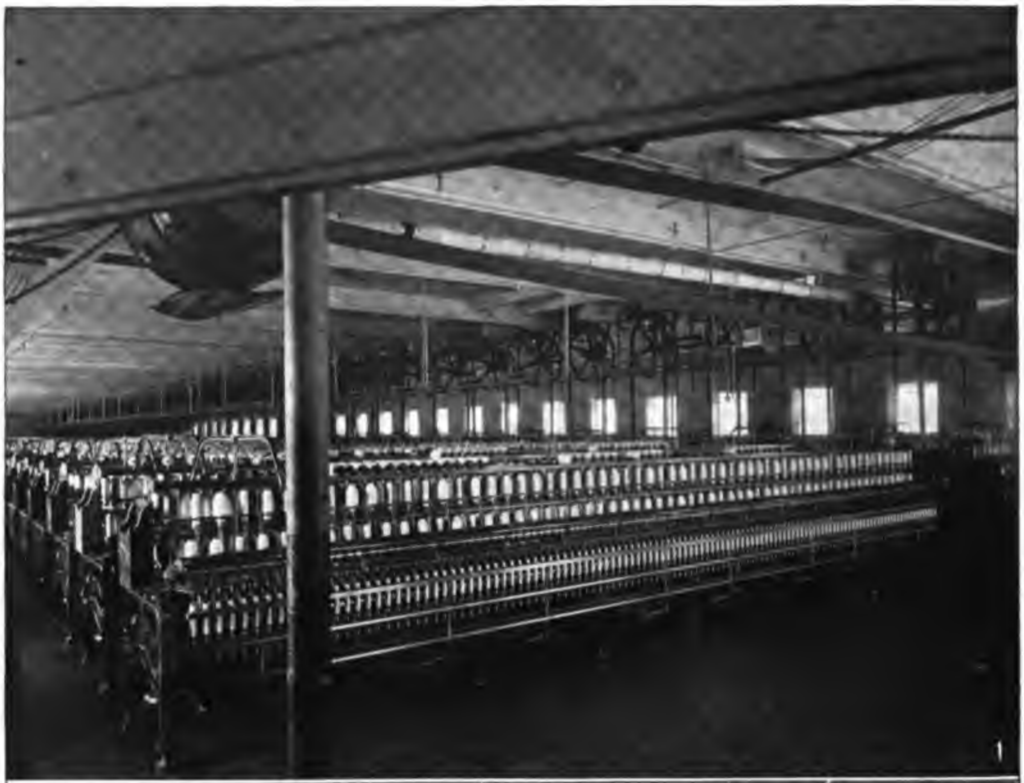
1 **Steamer *Natches* Discharging 4,000 Bales of Cotton at New Orleans** 2 **Cotton Market, Waco, Texas**
3 **Cotton Scene at a Country Town**



1 Modern warp-yarn spinning equipment

2 Weaving-room equipped with Northrup automatic looms

hydraulic ram, or a screw which is raised and lowered by a revolving nut. The bales turned out by this square press usually weigh 500 pounds gross, and average 28 x 56 x 42 inches in size and thus have a density per cubic foot of about 14 pounds. They are usually shipped from the gin house to some concentrating point where they are assorted and compressed, and their size is reduced to 28 x 56 x 18 inches, giving them a density of 30 or more pounds per cubic foot. They are then ready to be shipped to the cotton mills.

The large compressers which do this pressing are enormous machines weighing in some cases as much as 200,000 pounds, and are operated either by direct-acting steam cylinders coupled to the jaws of the press by multiplying levers, or the jaws of the press are brought together by a large link moved by hydraulic rams sitting directly over the press. The capacity of this press ranges from 800 to 1,200 bales in 10 hours. The bales while in the press are recovered and their bands are shortened to suit the reduced bulk.

Early in the present century the American Cotton Company developed a cylindrical bale, which permitted the cotton to be compressed more tightly and therefore to occupy less space in a freight car. A bat or layer of cotton is formed, rolled down very hard and wound up on itself, or rolled together under pressure and tension so that it forms a cylinder and tends to hold itself together. The square bale when compressed to more than 60 pounds to the foot required heavier bands or else it was apt to burst; but the cylindrical bale makes use of the cotton itself to hold it in place. It is simply wound up very tightly and tied, taking very readily a pressure of 35 to 40 pounds to the cubic foot. This bale is made in a bat-forming and condensing machine, and is usually made smaller and hence considerably lighter than the so-called square bale. This cylindrical bale has the advantage that it arrives at the cotton mill conveniently protected by bagging having neither wires nor hoops, and there is less tear and waste; it is also cheaper to manufacture.

Carding and Combing Machinery.— The first machine to which the cotton goes in a factory is the bale-breaker, on which the cotton is opened and beaten. In modern practice there is less beating of cotton and more dependence on air suction to remove the dirt. Automatic feeders are now used with breakers. The breaker-lapper, after cleaning the cotton stock, converts it into a lap or roll, after which it may go to a finishing lapper. The carding machine was invented by Lewis Paul and improved by Arkwright. Modern machines are usually of the revolving flat card type. The main cylinder of about 50 inches diameter bears card-clothing or a surface of points resembling a very fine wire brush. This clothing may have from 40,000 to 90,000 points per square foot. Above and opposed to this cylinder is an endless apron called a top flat, which also bears card-clothing. The cylinder and flats moving oppositely comb out or card, or render parallel, the fibres of cotton that come into the machine in the form of a lap, and the top flat removes all knots and snarls. This lap is taken up by the licker-in, a toothed cylinder that feeds or supplies the carding machine. After passing the cards the cotton is received by the doffer or doffing cylinder.

A recent French invention is the Roth aspirator, which is applied to combers as a substitute for the doffer or doffing combs. It is a perforated tube with a suction draft and does the work without any harsh handling of the cotton fibres. The Whitin and high-speed comber has 8 heads, takes laps 12 inches wide and has devices for reducing vibration. It runs normally at 135 nips per minute.

The cotton comes from the doffer as a fleecy strand termed a sliver. It is deposited in cans and may go to a sliver-lap machine and be formed into a lap about 15 inches in diameter and 10 or 12 inches wide. This lap may go to the ribbon lap machine, which doubles four laps into one, the object being to obtain greater evenness from the repeated doublings and drawings out, and paralleling of the fibres. The laps from the ribbon lap machine are placed on the comber, which doubles eight to one. A combed sliver yarn gets 640 extra doublings and is smoother and more lustrous as a result.

Drawing, Roving and Twisting.— The drawing frame receives the sliver, and by passing it between series of rolls at increasing speeds draws it out finer. These machines have been highly developed and are truly automatic. When the drawn slivers are slightly twisted they are termed roves or rovings. Roving machinery includes slubbers, intermediates, fine roving frames and jack-frames. The product of the roving machine is usually delivered on bobbins and may then be termed yarn.

The Spinning Frame.— This is the machine that made Richard Arkwright famous, it being a development of the spinning jenny invented by James Hargreaves. Many other machines in the cotton industry are based on the same operating principles as the modern spinning frame. It draws out the fibres and twists the cotton yarn hard and firm and winds it on bobbins. The modern frame first passes the roving through a series of rolls that permit a variation in twist. When drawn to the required density and twist the yarn passes to the bobbins, mounted on rows of spindles that stand upright and rotate on either side of the frame. Frames run from about 112 to 352 spindles each, the 240-spindle frame being now popular. After being spun, the yarn is doubled and twisted to form thread. It may be twisted wet or dry; in wet twisting the yarn is drawn from a creel through a trough of water. In modern twist frames a wide range of twist combinations is possible for making all kinds of thread. With a builder-motion the bobbins may be wound straight, taper-top or for warp or filling. While in the yarn it is often desirable to bleach, dye or mercerize the cotton.

The mule-spinner or spinning-mule, invented by Samuel Crompton, is in less use than formerly. It is a combination of the drawing-rollers and jenny used in the early history of modern machine weaving. It has a carriage that travels away from the drawing rollers as the threads are twisted and comes back as the thread is wound on the bobbins. While the mule draws, stretches and twists at one operation, it is not as satisfactory as the later and more highly developed frames. The ring-spinner or ring-frame is a spinning machine in which a metal loop revolves around each spindle to carry the thread. Spoolers and quillers are machines for winding the yarn on either spools or quills — the modern quill being simply a paper tube. See SPINNING.

Weaving Looms.— These are made in almost infinite variety for various purposes. The heavy-pattern loom, the wide loom and the end-cam loom are perhaps the most common. For fancy weaving the dobby loom is generally employed. There are also special gingham looms and looms for light and heavy duck weaving, and two-, four- and six-box fancy looms. See TEXTILES; WEAVING.

Testing Machinery.—A typical form of yarn-examining machine consists of a light hand-reel, in which a black card may be fitted to carry the wound yarn or thread. A moving guide spaces the yarn so that every strand is well separated. When wound the card of yarn may be placed under a microscope, or in the reflectorscope, which is a small box with a dark background, a mirror and an easily positioned microscope. To test yarn for dampness the conditioning oven is employed. A sample of yarn is hung on the scale of the oven and heated. As the moisture is dried out the reduced weight is registered on the scale. For strength-testing, an upright frame is provided with grips in which a number of leas of thread or yarn may be broken at one operation. If four leas are strained by the reel at one time, and the dial shows they break at 88 pounds, it follows that their average strength is 22 pounds. A single-thread recording tester is also manufactured. The operator can run through a sample, breaking it a dozen times, and follow this with other samples, and withdraw a card on which are recorded the breaking strains of each break of each sample. The average strength as well as the greatest weakness of a lot of thread is thus readily obtained. There are several forms of twist-testing machines and some record the contraction resulting from the twisting.

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COTTON MANUFACTURES IN THE UNITED STATES. Although cotton manufacturing is one of the oldest of the factory industries in the United States it had made but little progress until the embargo was laid upon foreign commerce during Jefferson's and Madison's administrations. It resulted in a remarkable development of the industry. Like all other industries it has had its periods of depression, but since that time there has not been a single decade — not excepting the Civil War period — when cotton manufacturing has not shown a substantial growth.

No statistics of the industry were collected until the taking of the Federal census in 1839. That census showed 1,240 establishments at work, giving employment to 72,119 persons and turning out products valued at $46,350,000. The next census, 1849, returned 1,049 establishments, employing 92,286 persons, with manufactured products valued at $61,869,000, while to the census following, 1859, there were returned 1,091 establishments giving employment to 122,028 persons and making wares valued at $115,682,000. Similar statistics collected decennially by the census (also for 1914), and including the capital employed, are as follows:

Census 1869:	
Number of establishments	956
Persons employed in the industry	135,369
Capital employed	$140,706,291
Value of products	$177,489,739
Census 1879:	
Number of establishments	756
Persons employed in the industry	172,544
Capital employed	$208,280,346
Value of products	$192,090,110
Census 1889:	
Number of establishments	905
Persons employed in the industry	218,876
Capital employed	$354,020,843
Value of products	$267,981,724
Census 1899:	
Number of establishments	1,055
Persons employed in the industry	308,237
Capital employed	$467,240,157
Value of products	$339,200,320
Census 1909:	
Number of establishments	1,324
Persons employed in the industry	387,771
Capital employed	$822,237,529
Value of products	$628,391,813
Census 1914:	
Number of establishments	1,325
Persons employed in the industry	797,315
Capital employed	$899,764,682
Value of products	$701,300,933

In addition to the value of the products in 1914, cotton goods to the value of $6,538,000 were produced by establishments engaged primarily in other lines of industry.

As measured by the amount of capital employed, and as indicating the progress made, the percentage increase in each decennial period is as follows: 1869–79, 48 per cent; 1879–89, 70 per cent; 1889–99, 32 per cent; 1899–1909, 76 per cent, and for six-year period 1909–14 9½ per cent.

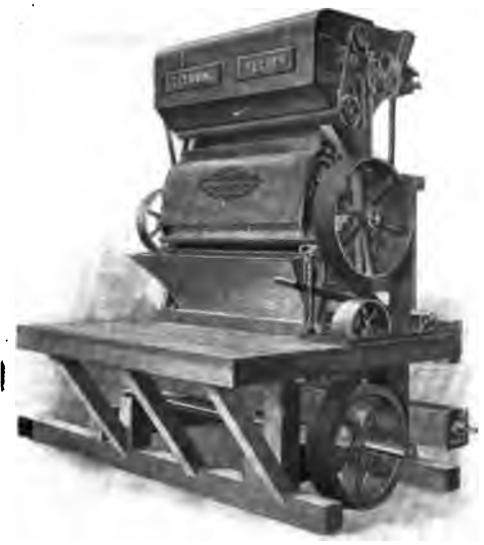
The number of spindles engaged in the production of yarn is another and more accurate method of measuring the growth of the cotton industry. Thus, taking the same decennial periods as above, and the seven-year period 1909–15, the following figures indicate the progress made in the United States, as well as in the cotton-growing States, New England and all other States.

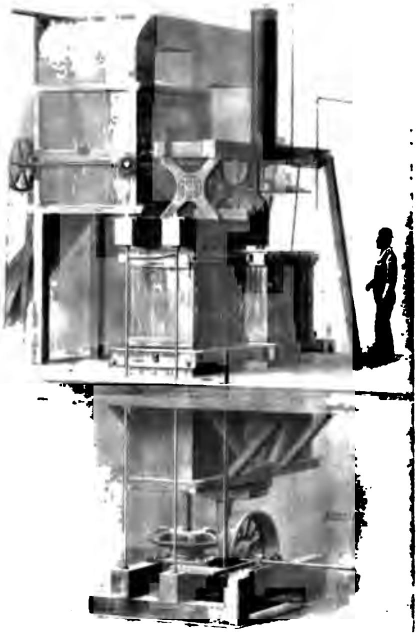
	United States	Cotton States	New England	All other States
1869–70	7,132,000	328,000	5,498,000	1,306,000
1879–80	10,653,000	561,000	8,632,000	1,460,000
1889–90	14,384,000	1,570,000	10,934,000	1,880,000
1899–00	19,472,000	4,368,000	13,171,000	1,933,000
1909–10	28,018,000	10,429,000	15,592,000	1,997,000
1915–16	32,806,000	13,382,000	17,474,000	1,950,000
1916–17	33,889,000	14,156,000	17,761,000	1,972,000

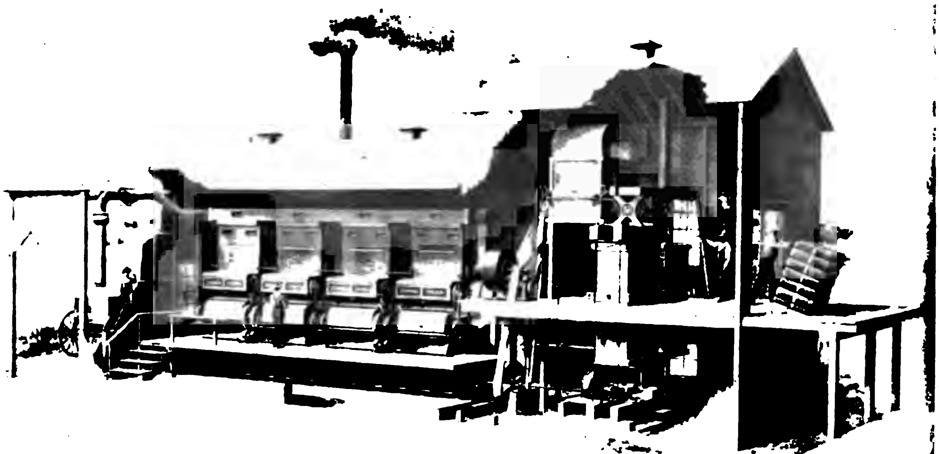
Beginning with 1869 the increase in the number of spindles the first decade, 1869–79, was 3,521,000 or 49.4 per cent; the second, 1879–89, 3,731,000 or 35 per cent; the third, 1889–99, 5,088,000 or 34.4 per cent; the fourth, 1899–1909, 8,546,000 or 44 per cent, and for the period 1909–15, 4,788,000 or 17 per cent. In addition to the above number of spindles, there were approximately 500,000 that used raw cotton mixed with other fibres in the manufacture of woolen goods, hosiery and knit goods.

The above figures show that within the past 16 years, or since 1900, the number of spindles in the United States has increased 14,417,000 or 77.4 per cent. But the most striking feature in

COTTON MACHINERY







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the progress of this industry is the remarkable increase in the number of spindles in the cotton-growing States. In 1900 these States operated only 4,368,000 spindles, as compared with 13,171,000 in the New England States and 1,933,000 in all other States. By 1916 they had added 9,788,000 spindles, an increase of 224 per cent, compared with 4,590,000 for New England, an increase of about 34.8 per cent, while in all other States there was an increase of only 17,000 spindles or less than 1 per cent.

The following table gives the number of mills, the number of spindles operated, and the quantity of domestic and foreign cotton consumed in each State, and the United States, during the season 1915–16.

Mills, Spindles and Consumption of Domestic and Foreign Cotton, 1915–16.

State	Number of mills	Number of spindles	Number of bales consumed		
			Domestic		Foreign
			Lint	Linters	
Alabama	60	1,111,660	346,185	6,032	48
Connecticut	98	1,343,573	124,755	28,661	19,827
Georgia	148	2,259,855	789,255	17,602	8,534
Illinois	27	56,568	12,914	10,070	93
Indiana	13	86,044	18,469	7,200	40
Kentucky	14	87,944	25,569	873	....
Louisiana	4	59,563	30,508	630	....
Maine	19	1,090,006	188,751	179	4,783
Maryland	27	147,009	85,503	883	11
Massachusetts	308	10,896,774	1,274,297	58,960	188,591
Mississippi	19	123,794	35,542	....	....
New Hampshire	27	1,455,282	282,157	....	12,509
New Jersey	70	479,873	42,590	54,488	20,074
New York	147	906,911	235,068	18,532	3,680
North Carolina	325	3,988,098	1,061,150	6,272	6,138
Pennsylvania	296	249,053	43,744	41,448	5,459
Rhode Island	148	2,552,765	234,014	....	45,219
South Carolina	162	4,735,193	914,506	4,706	26
Tennessee	22	319,148	98,627	25,566	80
Texas	25	116,012	59,063	9,705	118
Vermont	3	135,864	12,922	....	901
Virginia	14	506,166	112,395	....	1
All other States	122	93,728	52,634	589,109	863
United States:					
1916	2,098	32,805,883	6,080,618	880,916	316,995
1910	1,324	29,188,945	4,798,953	177,211	155,774

All of the New England States — except Vermont — the two Carolinas, Georgia and Alabama operated more than 1,000,000 spindles, Massachusetts being in the lead, followed in the order named by South Carolina, North Carolina, Rhode Island, Georgia, New Hampshire, Connecticut, Maine and Alabama. Massachusetts is also the largest consumer of raw cotton, North Carolina coming next, followed by South Carolina, Georgia and Alabama. As indicated by the increase in spindles, the largest increase in the annual consumption of cotton is in the cotton-growing States, the increase since 1910 amounting to 1,338,000 bales, or about 60 per cent, while the increase in New England since 1910 is 483,000 bales or about 24 per cent.

All of the cotton consumed in the United States is of domestic growth — except from 250,000 to 300,000 bales imported from other countries. Nearly 84 per cent of the foreign cotton is Egyptian, the remainder coming from China, Peru, East India and Mexico. The Egyptian cotton is used mainly for mercerizing and making highly finished cloths, balbriggan underwear, and lace curtains, sewing threads, and similar goods requiring a long fibre and great strength. Rough Peruvian cotton is used for mixing with wool in making woolen textiles, while the Indian, Chinese and other imported cottons are, to a limited extent, used for mixing with American upland for making the cheaper grade of goods.

The very short staple fibre delinted from the seed by the cotton-oil mills, and known as «linters,» is used for various purposes, such as upholstering and in the manufacture of mattresses, comforts, batting, cushions, wadding and pads; for mixing with shoddy and for making low grade yarns, wrapping twine, cheap rope, lamp and candle wicks; for making absorbent cotton; and in the manufacture of gun cotton, nitre powder and writing paper. The unprecedented consumption of «linters» in 1915–16, amounting to 880,916 bales, or an increase of nearly 114 per cent over the previous year, is explained through the great quantity of explosives manufactured for the Allied nations engaged in the European War.

The cotton manufacturing establishments in the United States turn out a great variety of products. Indeed, American ingenuity is constantly finding new uses for cotton, the most wonderful of all fibres. A classification of the cotton mill products for 1915 shows that of the 2,098 establishments in the United States, 1,069 of them manufactured almost every known variety of yarns from the coarsest to the finest, many of these also manufacturing cotton goods. The number of establishments making the different kinds of wares may be classified as follows: 296 manufacturing sheeting, shirting and drills, 107 colored cotton goods, 97 print cloths, 89 fancy white goods, 86 duck, 86 cotton twine, 81 fine white goods, 81 cotton cordage, 76 cotton webbing, 73 cotton braid, 65 cotton towels, 59 converters' goods, 57 cotton batting, 57 cotton tape, 54 ticking, 52 satteens, 43 cotton upholstery goods, 42 ginghams, 39 cotton felts, 36 cotton lace, 33 cotton flannel, 31 shoe laces, 31 denims, 30 cotton damask, 30 cotton bagging, 29 cotton plush, 23 cotton hammocks, 22 bed spreads, 19 cotton hair clothes, 17 cotton wicks, 16 cotton comforts, 16 absorbent cotton, 13 mosquito netting, 12 shade cloths, 11 cottonades, 11 tire fabrics, 10 book cloths, 8 crinoline, 6 cotton blankets. Besides these 1,893 establishments were engaged in the manufacture of hosiery and various kinds of knit goods.

According to the latest census statistics (1914) the total capital employed in cotton manufactures amounted to $899,765,000, of which $358,856,000 was invested in the cotton States, and $540,908,000 in all other States. The total value of all goods manufactured was $701,301,000 the products of the Southern mills representing $283,189,000 in value, and those of all other States $418,111,000.

The value of the cotton goods of domestic manufacture exported during the fiscal year 1914 amounted to $51,467,000, which was an increase of $27,067,000, or nearly 121 per cent since 1900. More than one-half of the value of the exports in 1914 is accounted for by the exports of bleached, unbleached and colored cloths, amounting to 414,860,000 square yards and valued at $28,845,000. Of the 199,887,000 square yards of unbleached cloths exported more than two-thirds went to China, the other countries in the order of the amount taken being Aden, India, Chile, Cuba, Philippine Islands, San Salvador, British East Africa, Turkey, Canada, Bolivia and Columbia. Of the colored cloths exported the largest quantity went to the Philippine Islands, and large quantities also to the West Indies, Central and South America and Canada. Of the other cotton goods exported Canada was the largest customer, taking very large proportions of the clothing and other wearing apparel, and of the various other manufactures of cotton. In this connection it is worthy of notice that the value of imported cotton goods in 1914 amounted to $69,411,000, or $17,944,000 more than the value of the cotton goods exported. The largest contributor to this trade was Great Britain, its imports being valued at $23,853,000, those of Germany at $17,618,000, France at $14,836,000, Switzerland at $10,335,000, Japan at $1,007,000, and all other countries at $1,759,000.

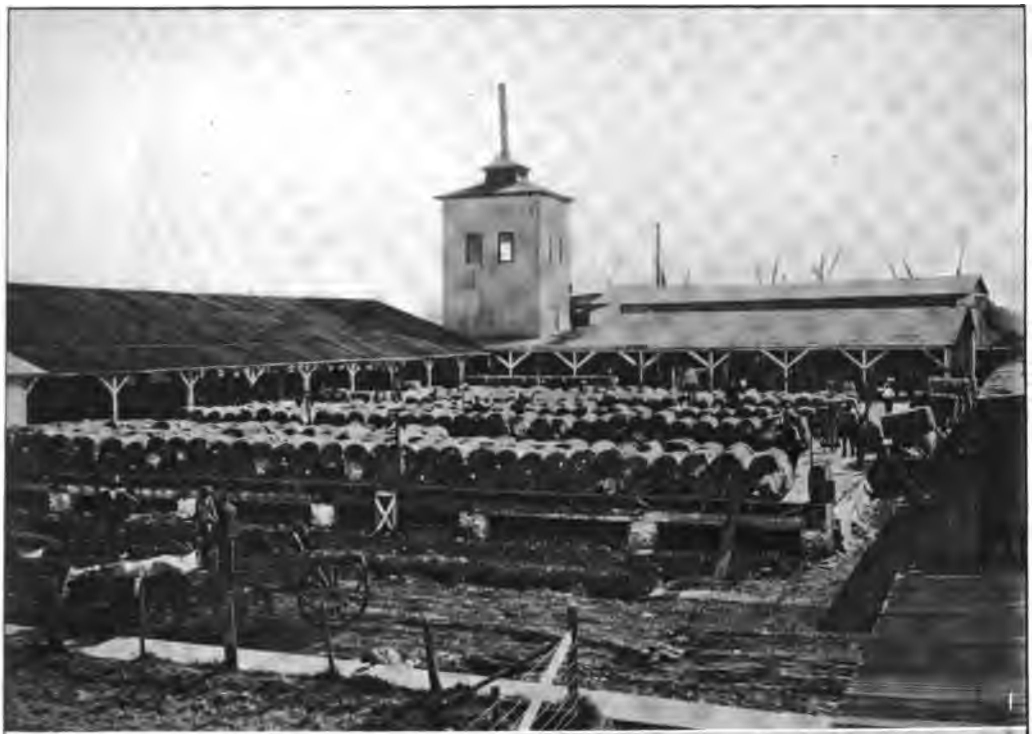
The value of cotton manufactures exported from the United States in the three years of war (1914–17) is one-half as much as in the 20 years before the war. A recent compilation shows that the value of cotton cloths alone exported in the fiscal year ended 30 June 1917 is nearly three times as much, knit goods seven times as much and cotton yarn eight times as much as in the fiscal year 1914. The quantity of cotton cloths exported in the fiscal year 1917 exceeds that of any earlier year except the fiscal year 1906, when the demand of China at the close of the Russo-Japanese War was exceptionally heavy. Even in cotton laces, of which the export value has been extremely small, the total for 1917 exceeds $1,000,000

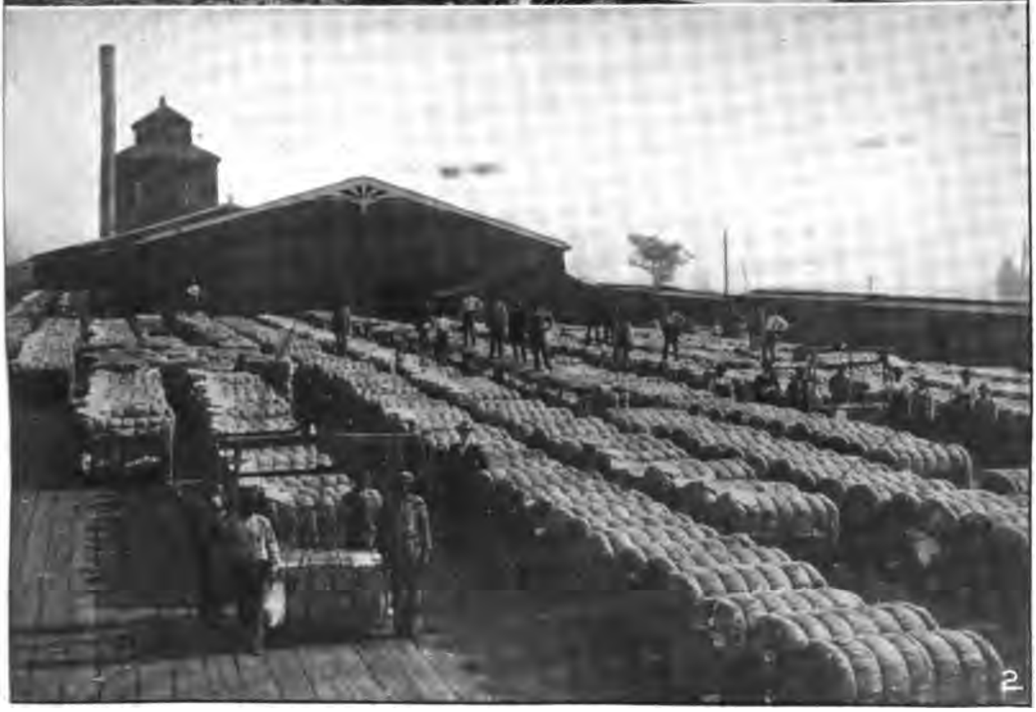
THE WORLD'S COTTON MILLS.

Compiled from the latest available statistics

COUNTRY	Number of mills	Number of spindles	Number of looms	Number of bales consumed	Number of persons employed
Great Britain	2,008	59,811,222	808,796	3,973,729	655,000
United States	2,098	32,840,730	719,358	7,278,529	797,315
Canada	67	1,396,937	32,211	195,992	18,794
Germany	372	10,162,872	230,200	1,979,958	375,000
Russia	99	7,665,654	213,179	1,400,000	370,000
Russia, Poland	38	1,322,257	31,000	325,000	50,000
Russia, Finland	6	236,890	5,741	30,000	6,850
France	430	7,400,000	108,000	1,120,000	160,570
Austria-Hungary	160	4,941,320	170,000	842,591	175,000
Switzerland	64	1,407,110	21,874	110,000	21,000
Italy	480	4,600,000	140,000	850,000	170,000
Spain	263	2,250,000	55,000	435,000	75,000
Portugal	35	428,000	12,000	80,000	28,000
Belgium	53	1,775,000	24,000	250,000	11,000
Holland	65	606,646	39,800	105,000	25,000
Sweden	49	461,764	12,442	120,000	11,810
Norway	13	84,530	2,717	15,260	2,888
Denmark	5	88,700	4,350	27,500	1,150
Bulgaria	5	19,539	350	5,000	632
Turkey*	10	71,574	....	40,800	2,054
Greece	19	73,898	1,160	23,250	3,503
Egypt	1	20,000	525	7,000	550
Asia Minor	7	41,000	....	47,400	3,030
East India	272	6,848,744	108,009	2,102,632	263,346
China	34	1,029,218	4,755	525,000	....
Japan	161	3,162,832	30,068	1,616,312	119,751
Indo-China	5	700,000	500	27,000	3,000
Philippines	2	7,740	352	1,560	300
Brazil	171	1,520,000	5,000	330,000	106,200
Argentina	6	9,000	1,200	....	1,600
Chile	3	5,000	400	....	454
Peru	7	52,250	1,750	12,600	....
Colombia	9	20,000	941	3,520	2,591
Ecuador	4	5,000	200	....	....
Venezuela	4	19,000	500	6,216	1,800
Guatemala	1	8,000	250	2,000	550
Mexico	139	762,149	27,019	160,000	34,500
Total	7,165	151,854,576	2,813,647	24,048,849	3,498,238

* Includes Cyprus, one mill with 1,574 spindles.

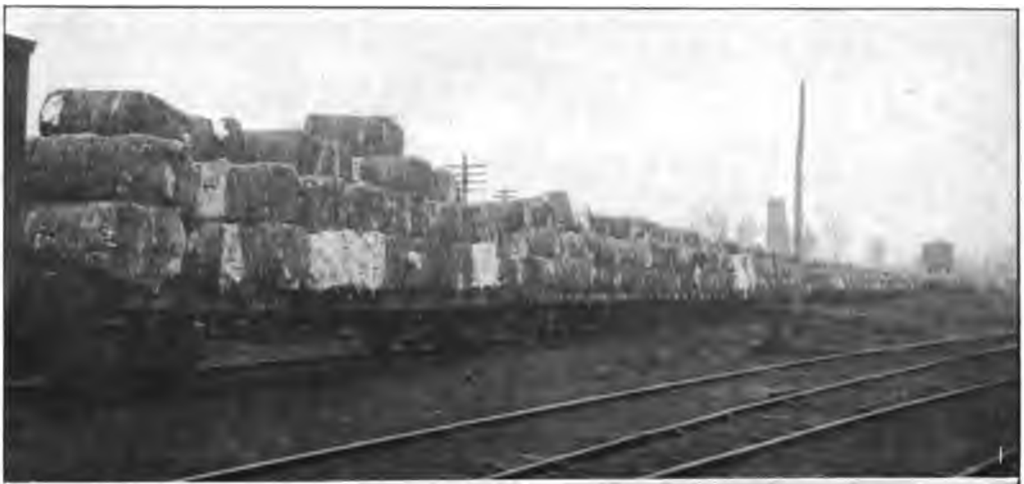


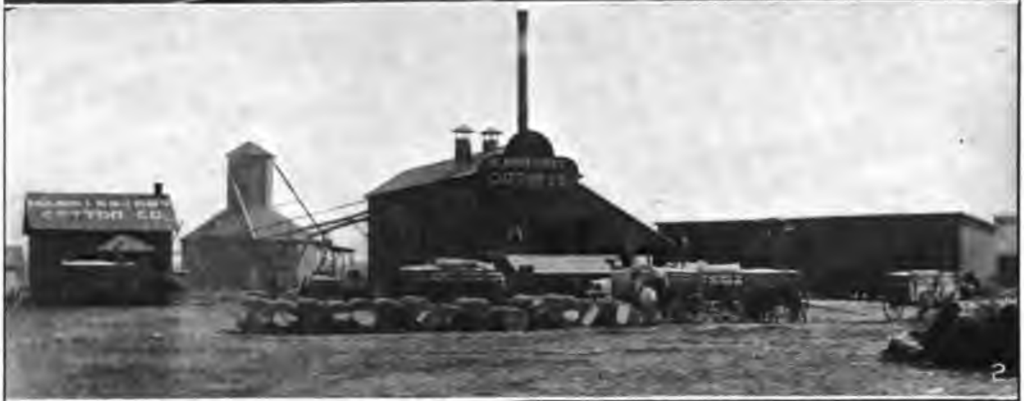


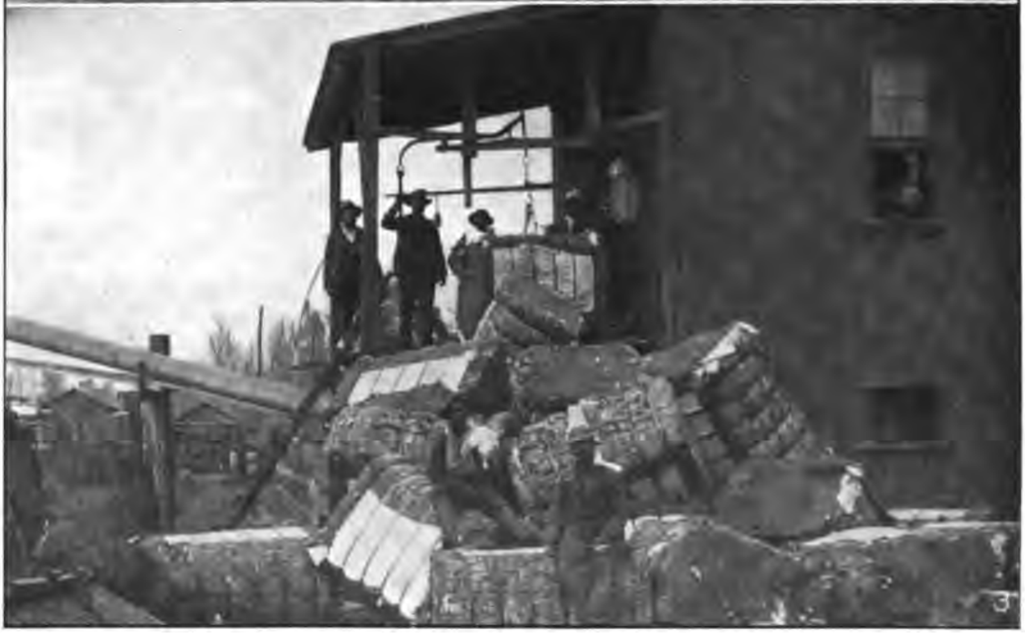
1 Scene at a Cotton Compress, Opelousas, La.

2 Cotton Compress, Alexandria, La.

COTTON







1 Flat-car Train in Arkansas Loaded with Cotton **2 A Modern Gin Plant, Oklahoma**
3 A Modern Gin Plant, Arkansas

EXPORTS FROM THE UNITED STATES OF COTTON GOODS OF DOMESTIC MANUFACTURE.
(000's omitted)

COTTON GOODS	Twelve months ending June —							
	1914		1915		1916		1917	
	Quantity, yards	Value dollars	Quantity yards	Value, dollars	Quantity, yards	Value, dollars	Quantity, yards	Value, dollars
Unbleached cloths	199,887	13,838	157,742	12,292	176,341	17,486	155,223	16,007
Bleached cloths	42,105	3,393	53,138	3,854	76,496	5,986	101,786	10,524
Colored cloths	172,868	11,614	186,064	12,536	297,782	22,942	424,800	44,800
Knit goods	....	2,547	....	13,080	....	20,861	....	17,708
Other clothing	....	8,221	....	16,470	....	13,365	....	13,098
Yarn	....	716	....	1,866	....	5,276	....	5,210
Other manufactures	....	6,572	....	8,939	....	22,264	....	31,376
Cotton waste	....	4,567	....	2,935	....	3,872	*49,931	5,940
Total	414,860	51,468	396,944	71,972	550,619	112,052	681,809	134,279
	Cloths, yards	Value, all goods	Cloths, yards	Value, all goods	Cloths, yards	Value, all goods	Cloths, yards	Value, all goods
Europe								
United Kingdom	2,387	$396	14,701	$2,979	23,687	$6,171	5,607	$2,245
Germany	185	22	11	1	....	....	....	....
Other Europe	1,416	137	12,203	1,452	32,407	3,424	....	....
America								
Canada	21,805	2,045	25,461	2,329	55,477	5,755	76,941	9,976
Mexico	4,053	406	6,334	521	40,448	2,874	71,253	7,425
Central America†	36,593	2,217	30,986	1,817	43,658	2,785	69,115	5,436
Cuba	23,599	1,590	40,684	2,672	60,639	4,362	56,390	5,538
Haiti	22,850	1,694	10,627	758	27,544	2,048	24,811	2,316
Other West Indies‡	28,350	1,739	31,810	1,940	55,739	2,371	44,267	4,211
Brazil	567	73	423	42	1,764	226	5,414	800
Chile	10,253	723	6,781	455	12,211	852	25,032	2,500
Colombia	14,571	757	14,557	711	33,562	1,877	32,140	2,581
Other South America	16,222	1,239	14,011	998	44,184	3,729	102,868	10,769
Asia and Oceania								
China§	89,156	6,096	17,053	1,195	12,332	936	4,123	380
British India	13,996	988	14,493	981	14,887	1,165	6,977	699
British Australasia	8,034	922	7,589	908	15,701	1,784	13,964	1,819
Aden	17,739	1,018	29,532	1,477	20,692	1,011	17,131	1,131
Other Asia, etc.	8,220	723	2,103	200	2,601	271	8,419	1,225
Philippine Islands	86,149	5,537	106,759	6,633	73,084	4,872	....	....
Africa	8,684	518	10,818	594	¶	....	....	....

*Pounds † Including Panama. ‡ Including Bermuda. § Including Hong Kong. ¶ Not separately given.

against less than one-quarter of a million in 1914. Cotton wearing apparel, which prior to the war was about $10,000,000 per annum, was in the fiscal year 1917 over $30,000,000. This increase in value of cotton goods exported is not merely due to higher prices. Of cotton cloths alone, for example, the exports for the fiscal year ended 30 June 1917 are about 700,000,000 yards against 397,000,000 in 1915, and in the other classes of cotton manufactures there has been a gain in quantity as well as in value. In May 1917, the latest month for which details are available, the quantity of cotton cloths exported is 63,000,000 yards, against 44,000,000 in 1915. Cotton yarn also shows a large increase in exportation since the beginning of the war, having amounted in 1917 to over $5,000,000 against $716,000 in 1914. This increase has been chiefly to our neighbors at the north and south. To Canada the exports of cotton cloths alone in the fiscal year 1917 is over 75,000,000 yards against 20,000,000 in the year before the war; to Central America, 63,000,000 yards against 37,000,000 in 1914, and to South America 170,000,000 yards against 42,000,000 in 1914. To the Orient, which formerly was our best market for cotton cloths, there is a distinct fall off, due to the fact that Japan is now manufacturing cotton goods largely for her Oriental neighbors. The quantity of cotton cloths exported from the United States to Asia in 1914 (the year before the War) was 125,000,000 yards and in 1917 but 38,000,000 yards. Even in the Philippines, which have been our largest customer in recent years for cotton goods, the total for the fiscal year 1917 is but 83,000,000 yards against 106,000,000 yards in the fiscal year 1915. The Philippines still take more cotton cloths from the United States than does any other country, though the values are less than those of Canada, which took in the fiscal year 1917 cottons of a higher price than those of many other countries, presumably utilizing them for war purposes. This is also true of the limited quantity of American cotton cloths taken by Great Britain. The marked fall off in the value of our exports of cotton goods to the Orient is illustrated by a comparison of figures of recent years with those at intervals since 1900. In the fiscal year 1916 the exports of cotton goods of all kinds to Asia were but $3,911,000 against $9,016,000 in 1914, $7,501,000 in 1910 and $31,352,000 in 1905. On the other hand the exports to Oceania show a large gain since 1900, having been in 1916 $9,455,000, in 1914 $8,730,000, in 1910 $4,187,000, and in 1900 $1,296,000. To South America the increase since the War is very large, the total for 1916 of cotton goods of all kinds being $15,336,000 against $3,785,000 in 1914, $3,347,000 in 1910 and $2,069,000 in 1900.

IMPORTS OF COTTON MANUFACTURES INTO UNITED STATES.

Cloths, imported from—	1917	1916	1915	1914
France, sq. yds	1,124,540	1,179,787	2,495,188	13,872,228
	$357,194	$332,677	$555,423	$3,704,545
Germany, sq. yds	62	110,729	867,123	3,813,167
	$38	$21,486	$183,730	$837,937
Switzerland, sq. yds	2,364,316	4,209,755	3,812,836	2,157,844
	$400,431	$671,936	$601,303	$373,531
United Kingdom, sq. yds	59,813,670	43,275,068	36,602,763	38,945,578
	$12,810,984	$7,393,949	$5,564,934	$6,529,466
Other Europe, sq. yds	933,149	464,976	1,202,275	1,019,085
	$188,348	$69,757	$171,986	$188,834
Other countries, sq. yds	8,964,382	3,706,071	1,818,234	1,825,427
	$1,072,825	$356,451	$208,945	$211,488
Embroideries, etc., from—				
France	$4,073,883	$4,963,120	$4,142,311	$8,058,399
Germany	8,528	627,880	3,317,037	5,903,754
Switzerland	3,030,971	6,796,509	6,190,329	9,295,500
United Kingdom	6,621,009	7,500,749	6,096,393	9,173,768
Other Europe	999,513	478,908	496,195	687,976
Other countries	1,563,266	786,226	558,001	746,425
Knit Goods, from—				
Germany	41,391	1,125,054	3,788,087	5,267,274
Other countries	364,696	288,171	361,340	404,589

To North America the total for 1916 is $39,970,000 against $20,459,000 in 1914, $12,485,000 in 1910 and $7,001,000 in 1900. The increase to Europe in 1916 and 1917 is very large, but occurs chiefly in knit goods and in a less degree in cotton cloths. The total of all cotton manufactures to Europe in 1916 was $35,536,000 against $3,614,000 in 1914, $1,996,000 in 1910 and $1,507,000 in 1900. Of this large total of $35,536,000 to Europe in 1916, $12,936,000 was knit goods, $7,287,000 cotton cloths and $708,000 other cotton clothing. Details of distribution by grand divisions in 1917 are not yet available.

JAMES L. WATKINS,
Cotton Statistician, New York City.

COTTON PRODUCTION OF THE WORLD. The ever increasing demand for cotton is not due alone to the fact that it supplies the world with the cheapest possible clothing, nor yet to the fact that 250,000,000 of the earth's inhabitants need cheap clothing to hide their nakedness, but largely to the additional fact that there are innumerable other uses to which cotton is adapted and for which there is no substitute. As might be expected, this continually increasing demand has stimulated its production throughout the world, until now it is cultivated on a larger scale than ever before. The following table, compiled from the most trustworthy authorities, gives the production in each country from 1910 to 1915, inclusive. The figures for the first 10 countries represent bales of 500 pounds each, those for all other countries running bales, the weights varying in each. The reduced crop of 1915 is partly due to the European War, as in East India and Egypt, where by government decree the average in 1915 was considerably reduced.

COTTON STATE, a nickname for Alabama.

COTTON WHIGS, or CONSCIENCE WHIGS. See WHIGS.

COTTON-WORM. See COTTON INSECTS.

COTTONIAN LIBRARY, a valuable collection of ancient manuscripts, books and coins, begun by Sir R. Cotton (q.v.), and much augmented by his son and grandson. His grandson, Sir John, wishing to make the library

COTTON PRODUCTION OF THE WORLD
(In Thousands of Bales).

COUNTRY	1915–16	1914–15	1913–14	1912–13	1911–12	1910–11
United States	11,191	16,135	14,157	13,704	15,693	11,609
East India	4,013	4,186	4,920	3,753	3,342	3,670
China	1,945	1,750	1,200	1,074	625	775
Russia	1,435	1,126	1,030	917	939	981
Egypt	1,178	1,384	1,496	1,492	1,463	1,506
Brazil	282	440	420	315	275	280
Persia	140	127	140	137	120	117
Turkey	155	120	130	115	124	105
Mexico	100	125	200	200	200	147
Peru	160	103	110	110	100	95
Indo-China	103	103	90	34	34	15
Japan-Korea	101	128	105	47	47	32
Dutch East Indies	30	30	45	45	45	45
Greece	30	30	30	30	30	15
Columbia*	11	8	10	10	10	10
Haiti	9	9	9	11	11	10
British West Indies	6	7	8	8	8	9
Argentina	5	5	5	5	2	2
Cyprus	3	9	10	8	7	1
Italy	3	3	3	3	3	3
AFRICA						
East and Central	39	55	41	48	38	34
Sudan	24	20	20	21	20	97
West	21	28	30	28	28	14
French	2	2	1	3	2	10
South	....	....	....	5	5	5
Philippine Islands	6	6	6	6	6	....
Total	20,992	25,939	24,216	22,129	23,177	19,588

* Includes the crop of Venezuela.

a public one, an act of Parliament was passed in 1700 for this purpose; in 1707 another act authorized the purchase of Cotton House and library on behalf of the queen and her successors; and in 1730 it was deposited in a house in Westminster. The next year a fire broke out there, whereby 114 volumes of manuscripts were burned, lost or entirely defaced, and 98 rendered imperfect. A great number of the injured volumes were effectively restored, so that the library consists of nearly 900 volumes. Nearly 200 are state papers of the greatest value covering the diplomatic relations of Europe from the reign of Edward III to James I. It was then removed to a new building in Westminster, and in 1757 finally removed to the British Museum. In addition to manuscripts, it contains many valuable coins and antiquities.

COTTONMOUSE, a small field mouse (*Peromyscus gossypinus*), a native to the southern portions of the United States, and destructive to cotton plants. It is dark brown in color, with grayish feet. Its habits are like those of the white-footed deermouse (q.v.), common in the North.

COTTONMOUTH, a common name in the southern States for the moccasin (*Ankistrodon piscivorus*), so called because of the whitish streak along the lips. The name is also sometimes applied to the copperhead snake (q.v.).

COTTONSEED OIL INDUSTRY. More than 2,000 years ago the Hindus mastered the uses of the cotton fibre, demonstrating its remarkable adaptability for spinning into fabrics to cover the nakedness of the savage or adorn the dress of the nobleman. But it remained for the practical genius of America to discover many other wonderful properties of the cotton plant; that its seed furnished an invaluable food for man and beast, and, when combined with other chemical ingredients, a most excellent fertilizer; that its stalks may be ground into pulp for making the finest kind of writing paper; that the ashes from the hulls of the seed yield a good grade of potash, and that even the root itself may be utilized for dyestuffs.

History of Cotton Oil.— To Dr. Otto, a Moravian, of Bethlehem, Pa., belongs the honor of making the first cotton oil ever produced in the United States. He began experimenting in oil from cotton seed and other vegetable seed about the year 1768. Samples of the oils obtained were sent to his friend Dr. Bond, of Philadelphia, and on 20 Sept. 1768 they were presented to the American Philosophical Society with the statement from Dr. Otto that one bushel and a half of cotton seed would yield nine pints of oil. Some 15 years later, 1783, it is said that the London Society for the Encouragement of Arts, Manufactures and Commerce called attention to the possible value of this oil.

It is of record in the United States Patent Office that on 2 March 1799, one C. Whiting obtained a patent for a "process for extracting oil from cotton seed." All of the records relating to this patent are supposed to have been destroyed by fire. Sir William Dunbar, an extensive cotton planter of Natchez, Miss., when the Mississippi territory was under British dominion, had some knowledge of cotton oil, for in ordering a cotton screw press from Philadelphia in 1801, he wrote his correspondent: "I shall endeavor to indemnify myself for the cost by making cotton-seed oil. It will probably be of a grade between drying and fat oils, resembling that made from linseed in color and tenacity, but less drying. Where," he asked, "can a market be found for such an oil?" Whatever kowledge Sir William may have had of cotton oil he made no practical use of it, but it is an interesting coincidence that 32 years later Natchez was one of the first places to attempt the manufacture of cotton oil.

The very first machine for hulling cotton seed was invented by J. Lineback, of Salem, N. C., and patented 31 March 1814. The records relating to this patent were also destroyed by fire, the only reference to it being contained in the index volumes, where it is referred to as "a cotton hulling machine." Meanwhile, it appears that Egyptian cotton seed was introduced into Europe and the manufacture and refining of cotton oil was begun and carried on to some extent in England and France.

So far as the United States is concerned, the first step in a practical direction to manufacture of cotton oil was made by Francis Follet of Petersburg, Va., to whom belongs the distinction of having constructed the first cotton oil mill in this country. On 21 Jan. 1829, he obtained a patent for a "machine for hulling and husking cotton seeds and separating the hulls from the kernels," and the same year constructed and put into operation a mill that was pronounced by competent judges from different parts of the Union as "second in importance, to the South, to the cotton gin only." In December 1829 Mr. Follet obtained a patent for improvements in his machine, meanwhile having formed a partnership with Mr. Smith, also of Petersburg. In an advertisement (1829) Messrs. Follet and Smith claimed that one of their two- or three-horse-power machines would hull and clean at one and the same operation from 20 to 25 bushels of seed per hour, which would yield one-third its measure, or 55 per cent of its weight in kernel from seed of fairly good quality; that one bushel of kernel would yield two gallons of oil, and perhaps one or two quarts more, equal to flaxseed oil if well expressed, and leaving 35 pounds of oil cake. It was claimed that because of its cheapness and aptitude for almost every purpose the oil would supersede all others in use, while the oil cake was a highly nutritious food for cattle, and these products would become important articles of export.

Commercial Extension.— As rude and imperfect as was the beginning in the manufacture of cotton oil, Follet and Smith succeeded in demonstrating that oil for commercial purposes could be extracted from the cotton seed, so long neglected and considered more or less of a nuisance. They sold their patent rights for most of the Southern States to A. Plummer & Co. which resulted in the construction, about the year 1833, of several more mills, viz., one near Raleigh, N. C.; one at Natchez, Miss.; one at Florence, Ga., and another at Mobile, Ala. The most pretentious and extensive of these mills was the one at Natchez, capable of turning out 1,000 to 2,000 gallons of oil per day. A New Orleans trade journal in 1836 noted the arrival in that city "by the steamer *Lamplighter*, from Arkansas," of 20 barrels of cotton-seed oil and 20 tons of cotton-oil cake, no doubt the product of the Natchez mill. As to how long the mills of this period continued in operation is unknown, but there is every reason for believing they had but a brief existence.

But there were a few men in the South fully alive to the great importance of utilizing this wasted wealth, prominent among whom were Dr. Edward J. Coxe and William Wilber of New Orleans. Dr. Coxe undertook to demonstrate that the planters were throwing away the seed of three-million-bale crop, that might be made to yield them millions of dollars annually; that 100 pounds of seed would produce two gallons of oil, 48 pounds of oil cake and 6¼ pounds of soap stock, and that if only one-half the seed was used the value of seed products would amount to $38,820,000. He also stated that as regards the oil, for dietetic or medicinal purposes, few could detect the least difference between it and the far-famed olive oil of Italy, and eaten with salad or rice it had the same flavor and taste of the best productions of Plaignol, Avigdor or Sue.

The oils experimented with at this time were chiefly made by Mr. Wilber of New Orleans. He exhibited a specimen of his oil at the annual exhibition of the American Institute, held at New York in October 1853, for which he was awarded a silver medal. In 1854 Messrs. Wilber & Co. constructed a mill in New Orleans and began making oil with a huller patented by Mr. Wilber the year following. From time to time Mr. Wilber improved upon his original machine and in a few years had so perfected it that the seed were pressed into oil without any handling except for the shape of cakes. This machine was so constructed that the seed was taken from the bin, introduced into the crushing apparatus, and thence the crushed material passed through the pressing machines to take off what was called "cold pressed oil"; thence the partially formed cake passed into the heating and reducing apparatus, where it was prepared for a subsequent pressing for suitable machinery which extracted the remaining oil in the crushed material producing "hot pressed" oil. From the last pressing machinery the oil cake passed under a knife and was cut into shapes convenient for handling. And so by this new process, it may be said, that the rough seed was introduced at one end of the machinery and came out of the other in the shape of oil and cake.

In 1855, through the enterprise of Messrs. Kendall and Klapp, the Union Oil Company was organized and a large mill was built at Providence, R. I. The same year Messrs. Martin and Aldige put up a mill at New Orleans, and a few months following another was built in the same city by A. A. Maginnis. About the same time two mills were erected at Memphis, one at Saint Louis, and a little later another at Brooklyn, N. Y. The seed for the New Orleans, Memphis and Saint Louis mills was obtained by water transportation from the plantations along the banks of the Mississippi, the steamboat lines carrying the seed at very low rates on return trips when other freight was scarce; the Providence and Brooklyn mills obtained their seed from New Orleans and other Southern ports through sailing vessels. The seed was purchased at ton rates, the price varying from $8 to $10, and was delivered in sacks furnished by the mills and containing from 80 to 100 pounds each.

When cotton oil mills were first built in the South the planters, who had previously allowed their seed to rot about the gin houses, were suddenly seized with the idea that their seed was a very valuable article of trade, and that the demand would far exceed the supply. Many, therefore, began to house and take care of the seed, and as plentiful as was the supply, the mills were obliged to pay $10 a ton for all they consumed. By and by, when the planters had figured out the quantity of seed produced in each bale, and the magnitude of the cotton crop, they put down the price, and in 1860 more seed was offered at $5 a ton than the mills could possibly consume during the year.

New Machines.— From 1855 to 1870 a dozen patents were granted for hulling machines, four for processes for extracting oil from the seed, five for cleansing the seed and two for delinting the fibre. Of these only four proved to be useful inventions, namely: the huller patented by William R. Fee, of Cincinnati, August 1857; another by F. A. Wells of Memphis, Tenn., October 1869; and two delinting gins, one by W. F. Pratt, of Bridgewater, Mass., June 1869, and the other by G. W. Grader, of Memphis, August 1869.

The hulling machine invented by William R. Fee attracted considerable attention, as it introduced the new principle of cutting the hulls in two instead of crushing them. All the machinery hitherto employed in decorticating the seed subjected them to a grinding action which so packed the hulls, fibres and kernel together that it was impossible to separate them in the process of screening without waste. When grooved cylinders were used, the grooves sometimes became so choked up as to necessitate separating the parts for cleaning, and it was found impossible to hull seed that were the least damp. This defective mode of hulling rendered the subsequent screening imperfect and occasioned a ruinous loss of oil, much of which was absorbed by the porous hulls and fibres of cotton. There was also an additional waste in the fragments of kernel screened out with the hulls. The Fee huller corrected all these faults. A single huller was capable of hulling three tons of seed per hour, which was claimed to be 24 times the capacity of any other huller. It was also claimed that by cutting instead of crushing, or grinding the seed, 30 per cent more oil was made from a given quantity of seed, and that it would also hull seed completely drenched with water. This huller, and also an hydraulic press, also invented by Mr. Fee, were in use at the mills in New Orleans, Memphis, Saint Louis, and at one or two places in Texas, and at Dayton and Cincinnati, Ohio, in 1860. Several of them had been tested and satisfactorily used as early as 1856. No little credit is due to Paul Adige of New Orleans, who about this period visited the important oil mills in Europe, including those at Marseilles, France, where he obtained much valuable and practical knowledge of extracting and refining cottonseed oil.

Market.— The best quality of crude oil found a market among oil refiners, who by a very simple process removed all mechanical impurities, and destroyed the coloring matter so as to produce an oil of a rich olive color, sweet and agreeable to the taste. It was found to be an admirable substitute for olive oil, and when flavored by an addition of olive could not be distinguished from the genuine article. This gradually found its way to the tables of private families and first-class hotels. The chief consumers, however, of the oil made from 1855 to 1870 were the soap manufacturers. From the crude oil they produced almost every grade of soap, from the cheapest family to the purest white castile, and the finest and most highly perfumed toilet soaps. The surreptitious use and mixture of the cotton oil with other oils brought it into disrepute and only small quantities under its true name found a ready market, except to the soap manufacturers.

Growth of the Industry.— The census returns of 1860 show seven mills in operation, three in Louisiana and one in each of the States of Missouri, New York, Rhode Island and Tennessee. They employed 183 persons who received $76,356 in wages, had $351,000 capital invested, paid out $358,000 for raw material and turned out products valued at $741,000. About 50,000 tons of seed were used, which yielded at the rate of 30 gallons per ton, and about 1,500,000 gallons of crude oil. Of the seven mills built prior to 1860 only three survived the Civil War, the one at New Orleans, the one at Saint Louis and the other at Providence, R. I. But no sooner was the war ended and the cotton planters began producing sufficient seed than the attention of enterprising capitalists was turned to cotton oil making as a profitable investment, and the industry again revived. So far as the mechanical process was concerned, about the only difficulty encountered at this time was the lint, or short fibres adhering to the seed as it came from the plantation gin house. This trouble was soon obviated by the delinting machines invented by Wm. F. Pratt, of Bridgewater, Mass., and Geo. W. Grader, of Memphis, already referred to. These machines were entirely distinct from the ordinary gin, taking the seed after the plantation ginning, stripping them of the short downy fibre, and thus preparing them for a more perfect separation of the hulls from the kernel. The delinting gin was constructed somewhat on the principle of the common saw gin, and consisted of a series of circular saws and a fluted roll, the roll serving as it revolved to turn the seed over and over, thus causing all parts of them to be acted upon by very fine teeth saws.

In the meantime various improvements were made in the detail workings of the machinery used for making cotton oil, which resulted in greatly increasing its capacity and cheapening the cost of making the oil. The capacity of the first huller in use was about one-third of a ton per hour; that of the hullers of the 1855–60 period about three tons per hour, and of the improved hullers of 1870–94 a still greater capacity. The presses used in 1855–60 had a capacity of about three tons per 24 hours, the more modern press 15 tons or more in the same time.

It having been clearly demonstrated that there was a demand for cotton seed products, and that the industry was a profitable one, mills began to increase. So that from three mills in 1865 with an invested capital of $225,000, the number in 1870, just five years after the Civil War, increased to 26 with a capital of $1,225,350; the number of hands employed was 664 and the wages paid was $292,032; the value of raw material $1,333,631 and the value of products $2,205,610. The quantity of oil produced was 2,490,883 gallons, valued at $1,547,218.

But as important as had been the improvements made in the cotton oil machinery at this time, of still greater importance were the discoveries of the value of the oil as a food product in various forms. In the beginning, or about the time the Follet and Smith mill was built in Petersburg, Va. (1829), it was first used, in an experimental way, as a paint oil, as an illuminant and lubricant, and then as food for stock. But now it was to find its way into the markets as a food product of great value.

The first use made of cotton oil as a food product was about the year 1855, when it was mixed with lard to temper it for consumption in cold climates. But this was done surreptitiously, just as afterward was done when it was used for mixing with other food. About the same time it was tested as a salad oil and was found to equal in purity the best olive oil. These experiments and tests were so satisfactory that the demand for it to mix with lard and olive oil steadily increased.

Sometime between 1865 and 1870 a Frenchman, Hypolite Mige, at the request of the French government, one authority says of Napoleon III himself, was induced to make the experiments that led to the discovery of a substitute for butter that was cheap enough to reach the poorer classes, and would also keep better than butter, and thus be adapted for the use of the navy. In 1873 he took out the first patent in the United States for artificial butter, and this was followed by nearly 50 other patents relating to the manufacture of oleomargarine, or some similar product of artificial butter. One of these patents was a combination of «swine fat, cotton seed oil, slippery elm bark and beef stearin,» and this led to a large consumption of cotton oil for making artificial butter.

The surreptitious mixture of the oil with lard and its use in the manufacture of artificial butter brought down upon the industry the combined opposition of the lard manufacturers and dairymen of the whole country, who sought by legislation to tax it out of existence. One result of the attempt to bring cotton oil into popular disrepute, and destroy its commercial value, was to subject it to careful and most searching analyses by the most eminent chemists in the world. Their verdict was uniformly in favor of the oil; not only that it was not harmful, but on the contrary a food product of the greatest value, being pure, nutritious and healthful. Its intrinsic merits became so well established that at one of the meetings of the Baltimore Grocers' Exchange (1887) the «Committee on Cotton Seed Oil» reported its superiority in every respect to hog's lard for cooking purposes — it was cleaner, did not become rancid in any season and was more healthful and nutritious, and entirely free from any odor or unpleasant taste, besides going one-half further in cooking and costing less in the proportion of 7 to 12.

About the year 1871 the American oil began to find its way into the Mediterranean ports for mixture with olive oil. Soon afterward the French and other European countries began using it for packing sardines, and it came into use for the same purpose on the coast of Maine.

A story is told of a Marseilles oil merchant who ordered a shipment of cotton oil from a New Orleans mill to mix with olive oil, the olive crop being short that season. He mixed the two oils in proportions of about one-half each, labeled it «pure olive oil» and exported it to South America where he had a good trade. The adulteration was not detected, so the next season he ordered a much larger consignment of cotton oil from New Orleans, and this time mixed the oils in proportions of about three-fourths cotton and one-fourth olive, again exporting it to his South American customers as «pure olive.» No complaint being made, another order for a larger consignment followed. This time only a very small quantity of olive was mixed with the cotton oil, and as before was labeled «pure olive» and exported. Still no complaint was heard; on the contrary, his South American trade grew so rapidly, and he prospered so, that he actually proposed a copartnership with the New Orleans mill, he to furnish the «pure olive» labels and packages from Marseilles, and the New Orleans mill to do the exporting.

No wonder, with the varied uses now found for cotton oil, the growing demand for it at home and abroad, the well-known fact that the mills were making handsome profits, that the industry should have grown so rapidly since 1870. In 1880 the number of mills had increased to 45, and the capital invested to more than three times what it was in 1870. The following table from the census of 1880 will show to what proportions the industry had grown to that date:

NUMBER OF MILLS, CAPITAL INVESTED, VALUE OF PRODUCTS, 1880.

STATE	No. mills	Hands employed	Capital invested	Wages paid	Cost of raw material	Value of products
Alabama	2	150	$82,000	$42,500	$158,000	$247,982
Arkansas	4	237	275,000	79,400	378,000	590,000
Connecticut	1	....	2,800	....	500	575
Louisiana	12	1,352	1,557,500	422,165	2,280,910	3,739,465
Mississippi	8	440	450,000	94,860	371,080	560,363
Missouri	2	55	80,000	18,750	80,000	140,000
Ohio	1	45	150,000	7,450	400,000	435,000
Rhode Island	1	32	125,000	14,899	415,870	485,085
Tennessee	9	644	935,000	163,340	812,000	1,225,000
Texas	4	511	202,000	36,272	192,441	276,450
Virginia	1	8	3,000	1,200	2,500	8,000
Total	45	3,474	$3,862,300	$880,836	$5,091,251	$7,690,930

At the fifth annual convention of the Cotton Seed Crushers' Association, held in Chicago in June 1883, it was stated that there were 101 cotton oil mills in the United States, 85 of which were then in active operation throughout the year. In 1884 this number increased to 130, and 10 years later there were just twice this number, distributed among the States as follows: Alabama 20, Arkansas 8, Georgia 37, Louisiana 19, Mississippi 24, North Carolina 17, South Carolina 28, Tennessee 18 and Texas 89.

Between 1899 and 1914 the number of mills increased from 357 to 872, or 144.3 per cent, and the quantity of seed crushed from 2,479,386 tons to 4,847,628 tons, or 95.5 per cent. The number of active mills has increased since 1909 in all of the States except Louisiana and Mississippi, where the industry has been greatly affected on account of the destruction of the cotton crops by boll weevils. There has also been a slight decrease in the number of mills operated in Arkansas and South Carolina. Texas shows an increase of 37 mills as compared with 1909; Oklahoma 21; Alabama 15; Georgia 10. All of the States, with the exception of Mississippi, show an increase in the quantity of seed crushed.

Value of Product.— The total value of crude cotton seed products manufactured in 1915 amounted to $180,260,000, compared with $107,528,000 in 1909, $69,311,000 in 1904 and $42,412,000 in 1899. Compared with 1909, all the States show an increase excepting Louisiana. The average value of products per ton of seed crushed was $17.11 in 1899, $20.72 in 1904, $28.10 in 1909 and $42.89 in 1915. The average value of oil produced in 1914 was 41.9 cents per gallon; of cake and meal $25.30 per ton; of hulls $7.99 per ton; and of linters 2.3 cents per pound. Since the outbreak of the European War the price of linters has increased threefold due to its importance in the manufacture of guncotton and other high explosives. The extraordinary demand for this short-fibre cotton has resulted in a readjustment of the delinter gins so that almost every particle of fibre is stripped from the seed, many mills even running the seed through the delinter gins a second time. In 1915 the average production of linters per ton of seed was slightly more than 100 pounds, in 1914 74 pounds, 67 pounds in 1913 and 1912, and 57 pounds in 1911. Not many years ago 30 pounds to the ton of seed was considered a good average. In 1914 oil represented 51.9 per cent of the value of crude products; meal and cake, 36 per cent; hulls, 7.2 per cent; linters, 4.9 per cent. The estimated quantity of seed produced from the crop of 1915 was 4,992,000 tons, of which the mills took 4,202,000 tons, or 84 per cent, leaving 790,000 tons, or 16 per cent, for planting, export, feeding and other purposes. This is by far the greatest percentage of seed ever taken from any crop, the average in recent years being about 75 per cent.

Present Process.— The present process of extracting the oil from the cotton seed is a rather complicated one in its preparatory stages, but is simplified to the last degree by the employment of machinery at each and every step. The seed, on reaching the mill, is first screened to remove sand, dirt, bolls and foreign substances, and finally a draft of air is used to complete the cleaning process. The seed is now ready for the linters, which machines are an elaboration of the ordinary cotton-gin; and whatever staple remains upon the seed is stripped off in passing through them. From the linters the seed passes to the huller, a high-speed cutting-machine, which cuts it up most thoroughly. The hulls, by screens and beaters, are now separated from the meats, which latter are, by screw-conveyers, conducted to bins contiguous to roller-crushers, and as fast as required are passed through the crushers, where the mass is reduced to a uniform consistency, and is known to millmen as "uncooked meal." The first step is cooking this meal, which is done in steam-jacketed kettles. When heated to a proper degree the meal is drawn from the kettles, formed into cakes, enveloped in camel's-hair cloth and placed in boxes of an hydraulic press, when by the application of proper pressure the crude oil is speedily extracted. The solid residue remaining in the press-box is the decorticated cottonseed oil cake of commerce.

In the practical methods by which these mills are supplied and operated all the improvements of modern industrial enterprise have been laid under tribute. In the distribution of the oil product, tank-cars on the railroads and tank-steamers on the high seas are used for transportation in bulk. The diversity of the industry requires factories other than the crude-oil mills, as refineries, lard and cottolene plants, soap factories, cotton-ginneries, cotton compressors and fertilizer-mixing establishments. The supply for all these is derived directly from the crude-oil mills, which in their turn are operated immediately from the raw material, in providing which there has grown up a most important branch of the agricultural system of the South.

New Uses.— One of the chief factors in the remarkable growth of the cotton oil industry has been the continuous discovery of new uses for its crude products, oil, cake and meal, linters and hulls. The uses found for each and products manufactured from each may be classified as follows:

LINTERS.

Batting, wadding, absorbent cotton, mixing with shoddy, mixing with wool in hat making, mixing with lamb's wool for fleece-lined underwear, felt.

Stuffing material for — Pads, cushions, comforts, horse collars, mattresses, upholstery.

Low-grade yarns — Lamp and candle wicks, twine, rope, carpets.

Cellulose — Writing paper, guncotton, nitro-cellulose, or pyrocellulose, smokeless powder.

Pyroxlin-Varnishes — Coating for metals, artificial leather, waterproofing.

Plastics — Celluloid, collodion, varnishes, artificial silk, photographic films.

HULLS.

Feed, fertilizer, fuel, packing, household utensils, bran-cattle feed.

Fibre — Stuffing for horse collars, basis for explosives, paper stock, pressed paper products.

MEATS.

Cake and meal — Fertilizer, dyestuffs. Feed for cattle, poultry, horses and mules, swine, sheep.

Flour — Bread, cake, cracker.

Crude oil — Refined oil — Prime summer yellow oil — cosmetics, animal compound lard, cooking oil, salad oil.

Hydrogenated oil — Lard substitutes, synthetic stearin, vegetable compound lard.

Cold pressed oil — Winter oil — Salad oil, setting olives, packing sardines, winter white oil. Stearin — oleomargarine. Emulsion for medical purposes, substitute for sweet oil, deodorized oil.

Off-grade summer yellow oil — Soap, miners' oil, hydrogenated oil.

Foots — Acidulated foots or black grease, washing powder, soap.

Glycerin — Nitroglycerin.

Fat acids — Candle pitch — Stearin acid — Candles, washing powder, soap. Distilled fat acids — Stearin pitch or cotton oil pitch. Roofing tar — Composition roofing, linoleums, insulating materials, oilcloth, waterproofing, cheap-paint base, cotton rubber. Artificial leather — Upholstering, bookbinding.

Oleic acid — Soap, washing powder, fulling ware.

Present Statistics.— The last census report (1914) shows that there were 882 establishments engaged in the manufacture of cottonseed products; that they employed 27,047 persons, who received in salaries and wages $14,409,000; that the capital invested was $118,073,000; that the cost of materials was $180,976,000 and the total value of products $212,127,000; and that the value added by manu-

NUMBER OF MILLS, SEED CRUSHED AND VALUE OF PRODUCTS IN EACH STATE, 1914.

STATE	No. of mills	Seed crushed, tons	Crude cottonseed products (000's omitted)				
			Oil, gallons	Meal and cake, tons	Hulls, tons	Linters lbs.	Total value
Alabama	86	428	17,627	201	119	27,537	$14,487
Arkansas	43	313	11,597	137	89	22,102	8,893
Georgia	155	865	33,389	405	252	55,707	30,138
Louisiana	32	161	5,911	77	39	11,907	4,364
Mississippi	69	506	21,312	232	139	35,652	16,697
North Carolina	63	329	14,602	149	95	17,259	11,865
Oklahoma	60	255	8,292	119	73	20,753	7,543
South Carolina	98	418	18,979	190	116	23,782	15,045
Tennessee	23	267	10,860	118	79	19,826	9,097
Texas	229	1,191	41,350	539	367	92,970	34,188
Other States	14	114	4,412	51	34	6,625	3,718

QUANTITY OF COTTON SEED PRODUCED, CRUSHED AND QUANTITIES AND VALUE OF PRODUCTS.

UNITED STATES	No. of mills	Cottonseed (000's omitted)		Cottonseed products (000's omitted)				
		Produced, tons	Crushed, tons	Oil, gallons	Meal and cake, tons	Hulls, tons	Linters, bales	Value of products
1915	844	4,992	4,202	167,110	1,923	1,220	890	$180,260
1914	882	7,186	5,780	229,260	2,648	1,677	820	156,036
1913	870	6,305	4,848	193,330	2,220	1,400	660	159,670
1912	857	6,104	4,579	185,750	1,999	1,540	583	132,230
1911	839	6,997	4,921	201,650	2,150	1,642	533	131,340
1910	810	5,175	4,106	167,970	1,792	1,375	380	142,710
1909	817	4,462	3,269	131,000	1,326	1,189	297	107,528
1908	....	5,904	3,670	146,790	1,492	1,330	330	86,090
1907	....	4,952	2,565	103,050	1,043	927	256	65,980
1906	....	5,913	3,844	153,760	1,786	1,593	307	94,380

EXPORTS OF COTTON SEED AND COTTON-OIL PRODUCTS.

YEAR	Cottonseed, tons	Cottonseed Products		Price of seed per ton
		Oil, gallons	Meal and cake, tons	
1915	1,238	35,537,328	528,961	$33.60
1914	3,157	42,448,870	739,533	17.90
1913	8,171	25,728,411	399,987	22.40
1912	12,024	42,031,052	564,046	19.20
1911	32,030	53,262,796	646,845	17.10
1910	6,612	30,069,459	402,298	25.80
1909	12,466	29,860,667	320,044	27.95
1908	25,813	51,087,329	616,875	15.70
1907	14,239	41,019,991	464,644	17.50
1906	8,814	41,880,304	670,484	13.76

facture (or the value of products less the cost of materials) was $31,151,000.

JAMES L. WATKINS,
Cotton Statistician, New York City.

COTTONTAIL. See RABBIT.

COTTONWOOD, species of *Populus* trees belonging to the willow family (*Salicaceæ*). There are two very common species in North America, *P. deltoides* and *P. candicans*. Besides these there are some 15 others, which occur under the names of poplar and aspen. The cottonwoods are large trees found along the banks of rivers nearly throughout North America. The wood is soft and weak, of a dark brown color and weighs about 24 pounds to the cubic foot. It is also known by the names of Carolina poplar and necklace poplar.

COTTONY CUSHION SCALE. See SCALE INSECTS.

COTTRELL, Frederick Gardner, American chemist: b. Oakland, Cal., 10 Jan. 1877. He was educated at the universities of California, Berlin and Leipzig, from 1897 to 1900 taught chemistry at the Oakland High School, and between 1902 and 1911 was instructor and assistant professor in the department of physical chemistry at the University of California. In 1911 he became chief physical chemist of the United States Bureau of Mines, and chief chemist in 1914. He has written 'Der Restrom bei galvanischer Polarization betrachtet als Diffusionsproblem' (1903).

COTYLEDONS, kŏt-ĭ-lē'dŏnz, the seed-leaves of the embryo plant, which serve it as organs of nutrition until the young vegetable is established in the soil and develops its true leaves. In flowering plants there are two kinds of embryos — one in which there is only a single cotyledon, and the other in which there are two cotyledons. This difference, being associated with several others of an important character, serves as the basis for the primary division of phanerogamic, or, more accurately, of angiospermous plants into monocotyledons and dicotyledons. The lower class of plants producing spores or cellular embryos having no cotyledons are called acotyledonous. On germination the cotyledons either serve as foliage-leaves or remain underground as fleshy lobes.

COTYLOSAURIA, kŏt-ĭ-lō-sâ'rĭ-ạ, the most ancient of reptiles, from which, as is claimed by the American naturalist, E. D. Cope (q.v.), and his adherents, sprang the saurian and snake-like species of later ages. Their remains are among the characteristic fossils of the Carboniferous and Permian Ages. They are characterized by Williston as primitive reptiles with notochordal vertebræ; imperforate temporal region; persistent intercentra; two coracoids; plate-like pelvis; with all or most of the amphibian skull-elements; short legs and short neck; phalangeal formula primarily 2, 3, 4, 5, 3(4).

COUCAL, koo'kạl, or **LARK-HEELED CUCKOO** (*Centropus*), a genus of common bush-birds in Africa, India and through the Malayan Archipelago to Australia. The hind toe is prolonged into a very long spur. The 35 known species constitute the sub-family *Cen-*

tropodinæ of the cuckoo family (*Cuculidæ*). One species is held in religious veneration in Madagascar.

COUCH. See QUILLER-COUCH, ARTHUR THOMAS.

COUCH, Darius Nash, American soldier: b. South East, Putnam County, N. Y., 23 July 1822; d. Norwalk, Conn., 12 Feb. 1897. He was graduated at West Point 1846, served in the Mexican and Seminole wars, and resigned from the army in 1855 to engage in business. During the Civil War he was commissioned brigadier-general 1861; commanded a division in the battles of Williamsburg, Fair Oaks and Malvern Hill; promoted major-general July 1862, and took part in Pope's retreat and the battle of Antietam. At Fredericksburg and Chancellorsville he commanded the Second Army Corps; organized the Pennsylvania militia to resist Lee's invasion 1863, and took part in the battle of Nashville and the North Carolina operations 1864–65. In 1865 he was unsuccessful as the Democratic candidate for governor of Massachusetts; and was collector of the port of Boston 1866–67. He removed to Connecticut soon after, and was adjutant-general of that State 1883–84.

COUCH-GRASS (a corruption of quitch-grass and quick-grass), a perennial grass (*Agropyron repens*) and one of the most common and troublesome weeds of agriculture. When it first appears above ground its blade is readily eaten by sheep. In arable land, under any tolerable management, the seeds are never allowed to ripen, and the propagation is effected by the numerous joints of the long trailing rootstock, each joint sending forth a shoot which becomes a new plant. The proper time for extirpating it is in summer, when the land is undergoing a pure fallow, or, where fallow is not used, when the land is being prepared for a root-crop. The most effectual means are a deep ploughing, going below the roots of the plant, a diligent use of the roller, grubber and ordinary harrows, and careful hand-picking. The rootstock may be used as food for various domestic animals, or, when prepared, as a medicine. The root is pulled up by the Germans and cut into small fragments and sold largely to venders of patent medicines. It has a large amount of gum which renders it somewhat demulcent, but its medical properties are nil, although enormous quantities of it are used in the United States by manufacturers of quack medicines.

COUCY, koo'sē, **Raoul,** rä-ool, or **Renaud,** rė-nō, **Châtelain de,** French chevalier; hero of a tragic story often celebrated in ancient ballads and songs, sometimes in connection with other names than his. He became Châtelain of Coucy in 1186, took part in the Third Crusade (1189–91) and was killed by the Saracens about 1203. His work consists of about 16 songs, in the troubadour style. They were published by Fath as 'Die Lieder des Castellan von Coucy' (Heidelberg 1883). He was in love with Gabrielle de Vergy, lady of Aubert de Fayel, and dying in the Holy Land, he directed his faithful squire to enclose his heart in a casket and carry it to the Lady of Fayel. He was surprised by the lord of the castle, who found out on what mission he came. Burning with rage, and determined on revenge he ordered the heart to be served at table. The unhappy woman, having eaten, was told the nature of this horrible meal, whereupon she refused all sustenance, and died of voluntary starvation. Uhland has made this story the subject of a fine ballad. The story is first told in verse by Jakemon Sakesep (at the end of the 13th century). There is a modern version by Crapelet (Paris 1829) and an English romance on the same subject in Ritson's, 'English Metrical Romances (Vol. III, 1885).

COUDER, koo'dā', **Louis Charles Auguste,** French painter: b. Paris, 1 April 1790; d. there, 23 June 1873. He studied in Paris under David, and later in Munich. Among his works are 'Cæsar on the Ides of March'; 'The Battle of Lawfeld'; 'The Opening of the States-General, 1789'; and 'The Siege of Yorktown'; the last three are at Versailles. In 1820, he decorated the Rotunda of the Louvre with frescoes which were unsuccessful. His decorations of several Parisian churches and his later pictures are decided improvements. As a member of the conseil supérieur at the Ecole des Beaux-Arts he wrote some critical works on art. Consult Breton, Jules, 'Nos peintres du siècle.'

COUDERSPORT, Pa., town and county-seat of Porter County in the northern part of the State, 110 miles southeast of Erie, on the Allegheny River and on the Coudersport and Pennsylvania Railroad. It contains a public library and a hospital. It has a foundry, a tannery, a flour mill and manufactures of furniture, rubber goods, mangle rollers, condensed milk, barrel headings, etc. Pop. 3,100.

COUDERT, koo-dẽr, **Frederic René,** American lawyer: b. New York, 1832; d. Washington, D. C., 20 Dec. 1903. He was graduated at Columbia College in 1850, and admitted to the New York bar in 1853. In 1877 he was a delegate of the New York Chamber of Commerce to the Antwerp Congress, which was held for the purpose of establishing a universal system of general average. In 1892 he was appointed one of the counsel on the part of the United States before the Bering Sea Tribunal of Arbitration in Paris, and was specially complimented by Baron de Courcel, president of the tribunal, for his argument on the necessity of putting a stop to pelagic sealing. On 1 Jan. 1896, President Cleveland appointed him a member of the Venezuela Boundary Commission. He had a world-wide reputation as an advocate and authority on international law, and several times declined appointment to the bench of the United States Supreme Court. He was the legal representative of the French government in the United States for many years. He received the cross of the Legion of Honor and also decorations from Italy and Venezuela. His publications include 'International Law, the Rights of Ships' (1895) and 'Addresses, Historical-Political-Sociological' (1905).

COUES, kowz, **Elliott,** American naturalist: b. Portsmouth, N. H., 9 Sept. 1842; d. Baltimore, 26 Dec. 1899. In 1861 he was graduated from Columbia University, Washington, D. C., and the year following entered the United States army as a medical cadet. His thorough work as assistant surgeon in the army, 1863–81, attracted attention, and for that and other services he was brevetted captain. For some years he continued to practice surgery or teach its science; but he also continued to pursue the study of zoölogy, begun while in the university. In 1873 he was appointed surgeon and naturalist for the United States commission which defined the northern boundary. For three years he remained connected with this commission, and in addition gave some assistance to the Smithsonian Institution. In 1877 he was called by the Columbian University to take charge of a department of anatomy, and later was appointed by the Virginia Agricultural and Mechanical College as professor of biology. He was associate editor of 'The American Naturalist' and other periodicals; and edited, for the Century Dictionary, the departments of comparative anatomy, biology and zoology. He was one of the founders of the American Ornithologists' Union, and an active member of many scientific societies in Europe and America. He was president of the board of control of the American branch of the Theosophical Society of India. His last years were given chiefly to the Smithsonian Institution. He has left a large number of valuable works on mammalogy and ornithology, some of which are 'Key to North American Birds' (1872); 'Field Ornithology' (1874); 'New Key to North American Birds'; 'Birds of the Northwest' (1874); 'Fur Bearing Animals' (1877); 'Birds of the Colorado Valley' (1878); 'New England Bird Life' (1881); 'Check List of North American Birds' (1884); 'Biogen' (1884); 'The Dæmon of Darwin' (1884); 'Our Native Birds.' He edited the 'Journals' of Lewis and Clark in connection with his investigations regarding the early exploration of the trans-Mississippi region.

COUGAR, koo-gär′, the great American cat (*Felis concolor*), which ranges from Hudson Bay to Cape Horn, a remarkable distance for any wild animal. It was formerly called panther by the settlers of the Eastern States; but in the West it is usually «mountain-lion» or «puma,» the latter name said to be of Peruvian origin. «Cougar» comes from a native Brazilian name. The cougar is from six to eight feet long from the tip of the nose to the tip of the tail. The cubs are apt to be spotted and marked; but this wears off with the advent of maturity; and, after the first year, the animal is a uniform reddish, tawny color, deepening in tone toward the spine, paler around the eyes, and whitish on the throat, legs and under portion. The color is so much like the hide of the Virginia deer that at a distance hunters have been known to mistake a cougar for a deer. This is one of the creature's great advantages as a beast of prey. He may be mistaken by his intended victims for an animal of their own kind, and thus is enabled to get into their midst before his identity is disclosed. In South America he is sometimes called, on this account, «false deer.» The head of the cougar is rounded, and the face is extremely intelligent, but crafty in general expression. The facial muscles can be drawn into as ferocious an expression as that of any of the great jungle felines of the Old World. It is said to be more cowardly and less dangerous than the other large carnivores; and it is asserted by authorities in good standing that it generally flees from man except in defense of the young, when the female becomes desperately brave. The puma will prowl about lone camps and logging-huts from curiosity or hunger, but rarely ventures on offensive warfare with humanity. This imputation of cowardice is denied by certain people, notably J. Hampden Porter, who says «there is no need to argue the question whether or not pumas will kill men; that has been affirmatively settled by facts»; and Theodore Roosevelt says, in his 'Hunting Trips of a Ranchman': «When hungry, a cougar will attack anything it can master.»

Though plentiful a century ago, in the eastern United States, the cougar is met with rarely, if at all at the present time, east of the Alleghanies. It may still be found in the Appalachian ranges and in the wilder parts of the Middle West. It is so troublesome to ranchmen that, especially in southern California, western Oregon and various other districts, a constant war, tending toward extermination, is waged upon the species by owners of cattle and sheep. In common with all cats, large and small, the cougar hunts preferably at night. Merriam says that it creeps to leeward of its intended victim; and, with noiseless tread and crouching form, passes over fallen trees and ragged ledges or through tangled thickets, until, if unobserved, within 30 or 40 feet of its quarry. Then it springs upon the back of the victim, plants its long claws in the quivering flesh, and with its sharp teeth despatches its prey. Deer, rabbits, ground-squirrels, ground-nesting birds, and even porcupines form part of its food. It will even catch and eat fish. But best of all it likes the flesh of young ponies, or even of full-grown horses,— a delicacy unknown to its bill-of-fare before the advent of the white race. When it has killed its quarry, the cougar drags it away to eat what appetite demands in the seclusion of its chosen covert; and, when its meal is finished, lies down besides the bloody remnant of its feast, and sleeps. This habit of napping when gorged has procured many a cougar its death at the hands of hunters, who track it by the blood and body of its victim.

The cry of the cougar is said to be one that will carry terror to the stoutest heart,—«a cry that can be likened only to a scream of demoniac laughter,» in the male; and in the female, to «the wail of a child in agony.» These cries, never heard by day or in captivity, are doubted by some as being so terrible as, heightened by the darkness and the silence of the night, they seem to the lonely hunter. In winter cougars congregate in the valleys of the western mountain regions and raid corrals for sheep and cattle, doing much damage. These depredations are so extensive and constant in Mexico as to be a serious menace to the business success of the ranchmen.

When very young the cubs are playful and kittenish, and may be readily tamed. Indeed, many experiments of this sort have been tried, and the records of such afford interesting reading. But with maturity they develop treacherous qualities which usually render them unsafe for human society. Cougars are often hunted with dogs, and any sort of dog, it is said, will do to scent them. They are not, however, creatures of the chase for sport, as are lions and tigers; but are usually hunted as vermin. When pursued by dogs they take to trees, and are kept there until the hunters come up, when they are easily shot. On the plains of South America they are frequently caught with lassoes by the mounted cattle-herders.

The cougar was held in religious veneration by the Indians of California, as was the tiger by certain sects in India; hence the red men did not dare to kill the beast, and it multiplied accordingly. Among the Zuñis it is regarded as the chief "prey-god."

COUGH, in physiology, a deep inspiration of air, followed by a sudden, violent and sonorous expiration, in a great measure involuntary, and excited by irritation of the air-passages, due to the presence of some foreign material or irritation of the nerves distributed to the respiratory organs. The organs of respiration are so constructed that every foreign substance, except atmospheric air, stimulates them. The smallest drop of water entering the windpipe is sufficient to produce a violent coughing, by which the organs labor to expel the irritating substance. A similar effect is produced by inhaling smoke, dust, etc. The sudden expulsion of air from the lungs is produced by the violent contraction of the diaphragm and the muscles of the breast and ribs. The contraction of the muscles is due to impressions reaching them by their motor nerves, such impressions coming from the nerve-centre in the medulla, thrown into activity by stimuli received from the irritated sensory nerves of the air-passages. The sensation of obstruction or irritation, which gives rise to cough, though sometimes perceived in the chest, especially near the pit of the stomach, is very often confined to the trachea, or windpipe, and especially to its aperture in the throat, termed the glottis. Of the various irritations which give rise to cough, some occur within the cavity of the chest; others are external to that cavity; some exist even in the viscera of the pelvis. Of those causes of cough which take place within the chest, the disorders of the lungs themselves are the most common, especially the inflammation of the mucous membranes. Here the cough may be a dry one, that is, without expectoration, and this occurs in the early stage of the affection, or a loose cough attended by expectoration, as in the later stage. In the former case it is due to the dry inflamed mucous membrane being very irritable, so that the cough is excited even by the coldness of the inspired air. In the latter case the presence of the defluxion causes the cough and thus excites its expulsion.

Pleurisy, or inflammation of the serous membrane which covers the lung and lines the interior of the chest, also gives rise to cough, this disease being almost invariably accompanied by inflammation of the outer layer of the tissue of the lung. It may be simple, but is very frequently associated with tuberculosis. Another common cause of cough which has its seat in the chest is inflammation of the lungs. In this disease there is inflammation of the tissue of the lungs, with exudation of fibrin, which solidifies the lungs and shuts up the air-cells. Much constitutional disturbance accompanies it. In the progress of the disease the exuded material softens, and, being swept up the air-tubes, irritates the passages and brings on the cough by which it is expelled. In such a case the cough is desirable rather than the reverse, since it is nature's method of sweeping out the foreign substance from the air-cells and tubes. Another frequent origin of cough is the rupture of some of the blood vessels of the lungs, and the consequent effusion of blood into the cells, which is expelled by the cough that its irritation excites, constituting what is technically termed hæmoptysis, or spitting of blood. Cough is also excited by the existence of tubercles in the lungs, one of the most frequent causes of consumption; and by cancer and growths in the lungs.

Then the irritation may arise at the back part of the throat, no disorder being present in the windpipe, bronchial tubes or lungs. Thus a long uvula, by tickling the back of the throat, may be the cause of a most persistent dry cough, coming on specially when the person lies down. Enlarged tonsils, a chronically thick condition of the mucous membrane of the back of the throat, small growths or polypi in this neighborhood or in the box of the windpipe, may maintain a most troublesome cough. Direct irritation of the nerves connected with respiration, as by the pressure of a tumor, the pressure, for example, of an aneurism in the chest on one of the nerves of the larynx, may excite spasmodic cough of a suffocative kind. Again, cough is very often excited by reflex irritation, the seat of the irritation being a long way from the air-passages. Where a cough is excited by disorders of parts external to the cavity of the chest, it is generally dry, as the irritating cause is external, and not any obstructing matter in the lungs themselves. Disorders of the viscera of the abdomen, especially of those which lie in contact with the diaphragm (the muscular curtain separating the cavities of the belly and chest), frequently induce a cough. A short, dry cough invariably attends inflammation of the liver, whether acute or chronic, and accompanies the various tubercular and other obstructions in that organ. Hence inflammation of the liver is not infrequently mistaken for inflammation of the lungs; and in some of the chronic diseases of the liver the cough is occasionally complained of as the most urgent symptom. The presence of pain in the right side, shooting up to the top of the shoulder, the dryness of the cough, and pain, enlargement, hardness or uneasiness on pressure below the ribs of that side, will afford the best means of distinguishing whether a disease of the liver is the origin of the cough. Disorders of the stomach are also often accompanied with a cough of the same dry and teasing nature. A short cough is, therefore, a frequent symptom of indigestion. In short, there is scarcely any one of the viscera in the cavity of the abdomen the irritation of which, in a state of disease, has not excited cough. Disorders of the spleen, pancreas, and even the kidneys, have all given rise to this symptom; and external tumors attached to them have had the same effect. Any distension of the abdomen, which, by its pressure upward, impedes the descent of the diaphragm, and consequently the expansion of the lungs, occasions cough. The variety of causes from which coughs may arise must convince every reader of the absurdity of attempting to cure all kinds of cough by the same remedy. The treatment can be satisfactorily indicated only when the real cause is ascertained. When a long uvula is the cause a small piece may be snipped off; when it is a relaxed condition of throat, or a similar state of the box of the windpipe, local applications, paints directly applied by a brush, or inhalations, are the suitable remedies. One of the commonest coughs attends slight swelling and irritability about the larynx. To relieve this warm poultices should be applied to the front of the neck, or a piece of flannel sprinkled with turpentine should be placed over the larynx on the neck. In bronchitis and inflammation of the lungs the treatment of the cough resolves itself into the treatment of the special disease, and so with the cough due to diseases of distant organs. Often soothing remedies must be given to allay the excitability of the irritated nerves. Certain coughs are purely psychogenic in origin and are to be grouped with the psychoneuroses.

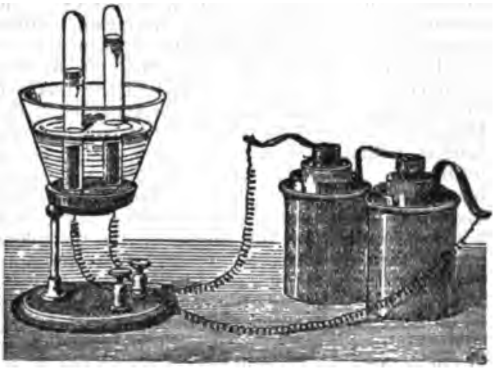
COUIY. See TREE-PORCUPINE.

COULANGES, koo-lañzh', **Numa Denis Fustel de,** French historical writer: b. Paris, 18 March 1830; d. Passy, near Paris, 12 Sept. 1889. After filling professors' chairs successively at Amiens, Paris and Strassburg, he was transferred in 1875 to the École Normale at Paris, and became a member of the Institute in the same year. In 1880 he became director of the École Normale. His earlier writings, 'Mémoire sur l'île de Chio' (1857); 'Polybe, ou la Grèce conquise par les Romains' (1858) had hardly prepared the reading public for the altogether exceptional importance of his brilliant book, 'La cité antique' (1864; 17th ed., 1885), which threw a flood of fresh light on the social and religious institutions of antiquity. The work was crowned by the French Academy, as was also his profoundly luminous 'Histoire des institutions politiques de l'ancienne France' (1874–92); while 'La Gaule romaine' (1888–91) and 'La monarchie franque' (1888–91), received the Reynaud prize. For biography consult Guiraud (Paris 1896).

COULOMB, koo-lěñ', **Charles Augustin de,** French scientist and inventor: b. Angoulême, France, 14 June 1736; d. Paris, 23 Aug. 1806. He is famous for his experiments on friction, and the invention of the torsion balance for measuring the force of magnetic and electrical attraction. In early life he entered the engineers' corps and served some time at Martinique. In 1777 he gained an Academy prize by a work on magnetic needles, and again two years later by his 'Theory of Simple Machines.' Coulomb was a member of the French Academy, and in 1784 was made intendant-general of the waters and fountains of France. During the Revolution he took part in the investigations attending the introduction of a metric system of weights and measures by the new government, being a member of the commission of 12 appointed under the provision of the law of 7 April 1795. His name has been given to the unit of electrical quantity.

COULOMB, the unit of quantity in measuring electric currents. It is the quantity produced by a current of one ampere in one second. It takes its name from its discoverer, Charles Coulomb (q.v.).

COULOMETER, in electricity, an instrument for determining the quantity of electric current which is passing through an electric circuit. In other words it is a measure of current efficiency. Several forms of coulometer have been proposed and many tests made with them. Three distinct principles have been employed; the iodine and the iron coulometers depend upon the chemical changes taking place as the result of the current; the copper and the silver coulometers depend upon the weight of a metallic deposit made by the current; the oxy-hydrogen gas coulometer depends upon the dissociation of water by the current. The last named was the earliest and is the simplest to operate. The figure shows this gas coulometer to the left connected with a battery which is being tested. A circular vessel has two wires let through its bottom, which bear inside two electrodes of platinum foil as shown; water slightly acidulated with sulphuric acid is poured into the vessel, and two tubes which have been filled with water are placed over each electrode. On the poles of the battery being connected with the exterior ends of the wires by means of binding-screws, water will be decomposed and hydrogen will appear in one tube and oxygen in the other. It will be found, as represented in the figure, that more than twice the quantity of water is displaced in the hydrogen tube than in the oxygen tube. Two volumes exactly of hydrogen and one volume of oxygen are the proper proportions to form water; but some of the liberal oxygen in the form of ozone is dissolved by the water. One of the drawbacks of this type of instrument is that it requires a certain minimum strength of current before it begins to operate.



Siemens Coulometer

An improved form of the oxy-hydrogen coulometer is the Walter-Neuman single-tube instrument. Instead of separating the two gases, it allows both to flow into the one tube, which is placed upright and graduated. The upper part, which is quite long, is about five-eighths of an inch in diameter and has a stop-cock valve at the top. This is used when the gases are taken to an eudiometer for more accurate measurement. The lower end of the tube is expanded into an oblong bulb of considerable content as compared with the smaller tube. The electrodes have each an area of one square inch and are set in the bottom of the bulb. A leveling tube is attached to ensure accurate reading. The advantages claimed for the gas coulometer are that it may be read instantly at the close of the test and that it has a smaller margin of error in that the amount of gas by which the measurements are made is so much larger proportionally than the metallic deposits or volumetric changes which must be relied on in the other instruments.

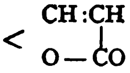
The so-called "silver coulometer," however, has the largest acceptance among scientific men, although the records show an almost endless series of disagreements as to extreme accuracy in the results obtained by its use by different operators. It was formally adopted by the International Electrical Congress, held in Chicago in 1893, as the most dependable of all the coulometers, and that congress fixed upon the deposition of silver as the official measure of the efficiency of an electric current, making the international ampere «that unvarying volume of current which, when passed through a standard aqueous solution of silver nitrate, shall deposit metallic silver at the rate of 0.001118 of a gramme per second.»

In the approved form of the silver coulometer the cathode is a small platinum bowl, and the anode is a circular silver plate. The latter is smaller in diameter than the bowl, and is riveted to a silver rod by which it is raised out of the bowl or lowered into it. The platinum bowl is set upon a clean copper plate which is connected with the appropriate pole of the battery to be tested. The other pole is electrically connected with the silver rod. Before beginning the test the bowl is washed scrupulously clean of metallic silver with nitric acid, and then with water and with absolute alcohol. It is then dried at a temperature of 320° F. and accurately weighed. The bowl is then nearly filled with a neutral solution of nitrate of silver in distilled water — 15 parts nitrate to 85 parts water. The silver plate is wrapped with a piece of filter paper in such a way that no sediment falling from it during the operation can fall into the bowl. The current is then turned on and the exact time noted. It is allowed to run not less than half an hour. When it is turned off the time is again noted. The silver plate is raised out of the liquid and the latter poured out. The deposit in the bowl is then washed with distilled water and left to soak in it for six hours at least. It is then rinsed with distilled water, and then with absolute alcohol and dried at 320°, after which it is allowed to cool in the drier, and then again weighed. The difference between the two weights will show the amount of silver deposited. This weight, in grammes, divided by the number of seconds during which the operation is continued, and then by the constant 0.001118, gives the number of coulombs of current in the circuit tested. A modification of this apparatus makes use of a porous cup set within the platinum bowl and containing a bed of granulated metallic silver upon which the silver plate is set down firmly. The porous cup effectively prevents the passing of any of the «slime» which accumulates among the silver granules, and which, being metallic silver, would tend to vitiate the test. Consult United States Bureau of Standards, 'Bulletin 3' (Washington 1905), and 'Bulletin 8' (1911).

COULTER, kōl'tėr, **John Lee**, American statistician: b. Mallory, Minn., 16 April 1881. He was educated at the universities of North Dakota, Wisconsin and Minnesota and at Iowa State College. Between 1907 and 1909 he was an instructor at Iowa State College, the University of Wisconsin and the University of Minnesota, where he also served for two years as assistant professor of rural economics. From 1910 to 1912 he was expert special agent of the United States Census Bureau, and during the same period he also lectured at George Washington University. He is dean of the West Virginia College of Agriculture and director of the Experiment Station. He has written 'Economic History of the Red River Valley of the North' (1910); 'Co-operation among Farmers' (1911); 'The Problem of Rural Credit' (1913), and many articles to current periodicals on economic and agricultural subjects.

COULTER, John Merle, American botanist: b. Ningpo, China, 20 Nov. 1851 He was graduated at Hanover College, Ind., 1870; was appointed botanist of the United States Geological Survey in the Rocky Mountains 1872–73; professor of the natural sciences, Hanover College, 1874–79, and professor of biology in Wabash College 1879–91. He was president of the University of Indiana 1891–93; president of Lake Forest University 1893–96, when he was elected professor and head of the department of botany in the University of Chicago. Among his many publications are 'Manual of Rocky Mountain Botany' (1885); 'Botany of Western Texas; Manual of the Phanerograms and Pteridophytes' (1891–94); 'Preliminary Revision of the North American Species of Cactus, etc.' (1894); 'Morphology of Spermatophytes' (with Chamberlain, 1901); 'Plant Relations' (1899); 'Plant Structures' (1899); 'Plant Studies' (1902), the last three being excellent introductory manuals for use in schools; 'Elementary Studies in Botany' (1913); 'Fundamentals of Plant Breeding' (1914); 'The Evolution of Sex in Plants' (1914). He is editor of the *Botanical Gazette*.

COULTER, Stanley, American biologist: b. Ningpo, China, 2 June 1853. He was educated at Hanover College. In 1887 he was appointed professor of biology and director of the biological laboratory at Purdue University and in 1907 dean of the School of Science. In 1902 he became a member of the State Board of Forestry. He wrote 'Forest Trees of Indiana' (1892); 'Flora of Indiana' (1899); also 11 pamphlets upon nature study, 45 pamphlets of scientific studies and reports and 70 other titles, and 'A Key to the Genera of the Native Forest Trees and Shrubs of Indiana' (1907).

COUMARIN, or CUMARIN, a compound of the aromatic series, having the formula $C_9H_6O_2$, or $C_6H_4 <$  $\begin{matrix} CH:CH \\ \vert \\ O-CO \end{matrix}$ and occurring in nature in the Tonka bean (the fruit of *Coumarouna odorata*, or *Dipteryx odorata*), in small white crystals, between the seed-coating and the kernel; also in woodruff (*Asperula odorata*), in the leaves and flowers of sweet-scented vernal grass (*Anthoxanthum odoratum*), and in other plants. It is obtained from the Tonka bean by extraction with strong alcohol, and may also be prepared synthetically by heating sodium-salicylanhydrid with acetic anhydrid, or by heating phenol with malic and sulphuric acids. It crystallizes in colorless triclinic plates, which melt at 159° F. Coumarin is scarcely soluble in cold water, but dissolves somewhat in hot water, and freely in alcohol. It has an agreeable, aromatic odor and a burning taste. Melted with solid caustic potash, it yields acetate and salicylate of potassium. The peculiar odor of Swiss schabzieger cheese is due to the coumarin existing in the melilot that is used in its manufacture. The "Maiwein" (or May-wine) of the Germans is prepared by steeping woodruff in white wine, and owes its pleasant aroma to the coumarin that that herb contains. Indeed, the woodruff is often dispensed with, and the Maiwein prepared by the direct addition of an alcoholic solution of pure coumarin.

COUMOUNDOUROS, koo-moon-dū'rŏs. See Kumundoros, Alexander.

COUNCIL (Lat. *concilum*), an assembly met for deliberation, or to give advice. The term as used in an ecclesiastical sense specially applies to certain assemblies of the Roman Catholic Church. These may be classed as ecumenical, provincial or patriarchial councils and synods; but the last is not usually included among councils. An ecumenical or general council is one in which the bishops and others entitled to vote are convoked from the whole world to deliberate on the state of the Church or to meet an emergency, as the rise of a new heresy. The decrees of such a council, having received papal confirmation, are binding. A council might be ecumenical in its convocation, yet if its decrees did not receive the papal confirmation they would not be binding, and the council would not be considered of ecumenical authority. Or a council might not be ecumenical in its convocation, but its decrees being accepted and receiving the papal confirmation, it is then classed as ecumenical. The First Council of Constantinople was originally a council of the East, but ultimately its decrees on faith were accepted in the West and received the confirmation of the Pope. Patriarchial councils represent a whole patriarchate; national councils, a nation; and primatial councils, provinces subject to a primate. (See Patriarchs). Provincial councils are of a province and are known usually by the name of the metropolitan see. (See Metropolitan). Diocesan councils, usually termed synods, are composed of the clergy of the diocese and are presided over by the bishop or vicar-general or a representative of the bishop.

Ecumenical councils are convoked by the Pope, and are under his presidency or that of his legate. In the early ages of Christianity councils were sometimes convoked by emperors, but only by permission or by request of the Pope. The dangers and difficulties of traveling in those times made it necessary to have the protection of the civil powers, and hence the real part which the emperor took in convoking the council was to promise it immunity from those who might wish to influence or retard its deliberations. The patriarch, metropolitan or bishop convokes the council within his jurisdiction. The membership of councils not ecumenical consists of the local clergy, as in a diocese, or the suffragan bishops of a province or patriarchate. Certain rules regulating representation are observed. In the early ages (and even as late as 1598), laymen were sometimes invited to attend provincial councils. They were permitted to present complaints and give advice, but it is very doubtful if they ever took any part in the voting. In two instances at least women attended. (See Hilda, Saint). Ecumenical councils are composed of patriarchs, archbishops and bishops and such other ecclesiastics as may be invited for specified reasons, as theologians, one at least for each archbishop or bishop. (The Council of Trent gave procurators — priests and deacons — of absent bishops a right to vote. The Vatican council did not even admit to the council hall such procurators). In matters of faith the Holy Scriptures and the traditions of the Church are the guide, while in lighter matters human reason and expediency are consulted. In the former, ecumenical councils are held to be infallible, but in other matters of discipline, etc., the latest council decides questions. Cardinals, even if not bishops or abbots, generals of regular orders, mitred abbots of whole orders, may be members with right to vote. The rule has always prevailed that no royal representative may be present at any council except a general one in which "faith, reformation and peace" are in question.

The presidency of a council does not confer an ex officio right to vote or to take part in the deliberations, such right depending upon the hierarchical rank of the one presiding.

Usually bishops take their places according to the rank of their sees. At the Vatican council they were arranged according to their hierarchical rank,— first the Pope, then the cardinals, patriarchs, primates, archbishops, bishops, abbots and generals of orders. The voting is generally by single vote, but at Constance the vote was by nations. At Basel the members were divided into four deputations which met separately. Decrees passed by three deputations were accepted by all. At Trent much of the matter to be debated was first considered by commissions. (See Counter-Reformation). The proceedings of the Vatican council, not yet finished, were conducted in a somewhat similar manner.

Church historians usually regard the assembly of the apostles in Jerusalem described in the Acts of the Apostles as the first example of a general council of the Church; yet that assembly is not entered in the list of the 20 general councils. From the times immediately subsequent to the epoch of the apostles, the fathers always on occasion of controversy over questions of faith or of discipline appeal to the tradition of the apostolic doctrine and government as preserved in the churches founded by the several apostles or authentically derived thence, to the churches scattered over the world. Not till peace was assured to the Christian body by Constantine was it deemed prudent to hold a general assembly of the Church's pastors, the bishops; though in various provinces of the empire — in Gaul and Spain, in Mesopotamia, in Africa, synods or councils were held even in the times of persecution. But in the year 325 there assembled at Nicæa in Bithynia, at the call of the emperor, the first or Nicene council. As this council and many which followed were in their membership predominantly Eastern, so in later councils Western bishops predominated; and for some time the decrees of these predominantly Eastern, or predominantly Western, councils were not accepted by both sections; but in time many of them received a tacit acceptance as expressing the teaching of the whole Church Catholic; while the decrees of other Eastern and other Western churches are ignored on one side or the other.

The general or ecumenical councils of the

Church, as reckoned by Roman Catholic historians, are as follows:

		A.D.
1.	Council of Nice (*Nicæa*)	325
2.	First Council of Constantinople	381
3.	Council of Ephesus	431
4.	Council of Chalcedon	451
5.	Second Council of Constantinople	553
6.	Third Council of Constantinople	680
7.	Second Council of Nice	787
8.	Fourth Council of Constantinople	869
9.	First Council of Lateran	1123
10.	Second Council of Lateran	1139
11.	Third Council of Lateran	1179
12.	Fourth Council of Lateran	1215
13.	First Council of Lyons	1245
14.	Second Council of Lyons	1274
15.	Council of Vienne	1311
16.	Council of Constance	1414–1418
17.	Council of Basel	1431–1438
	Council of Basel continued in Council of Ferrara-Florence	1438–1442
18.	Fifth Council of Lateran	1512–1517
19.	Council of Trent	1545–1563
20.	Council of the Vatican (not finished)	1869

Of these councils the Greek Church acknowledges the first seven. See separate accounts of the different ecumenical councils.

Among religious bodies of the Protestant faith the word council is applied to assemblies lacking the authoritative form of the Roman Catholic councils. In the Baptist and Congregational denominations it is customary to use the term council in relation to gatherings called on matters of local or restricted interest or in connection with ordinations or other church functions. A national council in these denominations is advisory in its nature. The Pan-Presbyterian Alliance is in the nature of a council of churches following the Presbyterian form of organization and holding the Reformed faith. The Evangelical Alliance (q.v.) is broad and inclusive in its constituent elements and in the themes considered. In the systematic nature of their organizations and the authoritative character of their decisions the councils of the Roman Catholic Church are more nearly related to the permanent governing bodies of evangelical sects charged with the regulation of faith, order and discipline — such as the general and diocesan conventions of the Protestant Episcopal Church, the general assemblies and synods of the Presbyterian Church, the general conferences of the Methodist Church, etc.

In its use as a term relating to civil government, the word council signifies a body of men selected to advise a sovereign or other ruler. The body exercising such functions in Great Britain is known as the privy council (q.v.). In colonial times there existed in America councils modeled on the English privy council and originally intended as the executive bodies of the various provinces, in conferences with the respective governors. Such a body was called the executive council or legislative council, or simply the council, and besides its executive functions bore much the same relation to the popular assembly that the senate does to the house in the States. As the legislatures developed into the form in which we now know them, the upper house kept the name council till long after the Revolution; in South Carolina till 1790; in Delaware till 1792; in Georgia till 1798 and in Vermont till 1836. The Territories have retained the name, and it is used in some States for a body like that in the old provinces, the executive council of the governor. The great history of the councils from the Apostolic Age to the Council of Trent is by C. J. Hefele, assisted in the latter part by A. Knöfler and Cardinal Hergenröther (9 vols., Freiburg 1855–90). Consult also Mansi's collection of canons and other acts of the councils (31 vols., Florence and Venice 1759–98); Percival, 'Canons and Dogmatic Decrees' (New York 1900).

COUNCIL OF BLOOD, The, a court created in the Netherlands by the Duke of Alva, its object being to put down all agitation caused by the religious and political tyranny of Philip II. Its first session was held 20 Sept. 1567, and in less than three months it had put to death 1,800 persons, among them the counts of Egmont and of Hoorn. See ALVA.

COUNCIL BLUFFS, Iowa, city and county-seat of Pottawattamie County, situated on the left bank of the Missouri, opposite Omaha, Neb., at the junction of several railroads, chief of which are the Union Pacific; Chicago and Northwestern; Chicago, Milwaukee and Saint Paul; Chicago, Burlington and Quincy; Chicago, Rock Island and Pacific; and the Illinois Central. The name is said to have been derived from a council held here in 1804 between the Indians and the explorers Lewis and Clark. In April 1847 the Mormons, who had been violently expelled from this place, became the pioneers of the new Mormon settlement of Utah. The city is well laid out, with brick-paved streets, and lies to a great extent on a plain underlying high bluffs. Electric lines connect it with Lake Manawa, a beautiful summer resort three miles south of the city, and with Fairmount and other parks. Council Bluffs is the seat of the Iowa School for the Deaf, and has a fine public library building. Railroad and wagon bridges over the Missouri and electric lines connect it with Omaha, with which city there is extensive traffic. Council Bluffs is one of the great agricultural-implement trade centres of the world and also has a large trade in fruit and produce. There are eight large grain elevators. The city government is vested in a mayor, elected for two years, and a city council. Pop. 30,000.

COUNCIL OF THE ELDERS (*conseil des anciens*). See DIRECTORY.

COUNCIL OF FIVE HUNDRED (*conseil des cinqcents*). See DIRECTORY.

COUNCIL GROVE, Kan., city and county-seat of Morris County, situated on the Neosho River, and on the Missouri, Kansas and Texas and the Missouri Pacific railroads, about 50 miles from Topeka. It is the centre of rich grazing country, and its principal business is connected with stock raising. The city is situated on the old Santa Fé trail, and contains a public library. It was settled in 1847 and is one of the oldest towns in the State. It adopted the commission form of government in 1911. Pop. 3,000.

COUNCIL OF THE INDIES, The, a tribunal to which, in conjunction with the *Casa de Contratación*, or India House, at Seville, the administration of the Spanish colonies was assigned by King Ferdinand. It was the business of these two tribunals to further the progress of discovery, watch over the infant settlements and adjust the disputes which grew up in them. Eventually the India House was subordinated to the council, the powers of the latter having been greatly extended in the reign of Charles V.

COUNCIL OF TEN, a secret tribunal in the old republic of Venice, instituted in 1310, after the conspiracy of Tiepolo. It was first composed of 10 members who wore black costumes; later six more, who wore red, were added. This council was founded to protect the interests of the state, and it had power to punish its enemies. All its processes were secret, and through its means some of the most wicked and bloodiest crimes were committed. At first established temporarily, it was prolonged from year to year until 1335 it was declared perpetual. It went down with the republic in 1797. The archives of the council extending from 1315 to the end of the republic throw great light on the history, political, ecclesiastical and economic, from that period to the end of the republic. Consult Brown, 'Studies in Venetian History' (2 vols., London 1907).

COUNCIL OF TRENT. See Counter-Reformation.

COUNCIL OF WAR, an assembly of officers of high rank called to consult with the commander-in-chief of an army or admiral of a fleet on matters of supreme importance. The commandant of a garrison will accept or generally solicit the advice of such a council before surrendering to an enemy.

COUNCILLORS, City. See City Councils, American.

COUNCILMAN, William Thomas, American physician: b. Pikesville, Md., 2 Jan. 1854. He was educated at the University of Maryland, and at Vienna and Leipzig, was for some time associate professor of pathology in Johns Hopkins University and has been Shattuck professor of pathological anatomy at Harvard University since 1892. He has given much attention to the study of smallpox and has recently announced his important discovery of the probable etiology of smallpox. He has published 'A Contribution to the Study of Inflammation' (1879); 'On the Etiology of Malaria' (1884); 'Syphilis of the Lungs' (1890); 'Pathology' (1902); 'Pathology: A Manual for Teachers and Students' (1912); 'Disease and its Causes' (1913); besides monographs on dysentery, cerebrospinal meningitis, diphtheria, smallpox, and other papers.

COUNSEL, in the United States a term applied indiscriminately to all members of the legal profession retained in a cause; as, the counsel for the defendant. In the United Kingdom the word has a limited and specific use, "lawyers," as the term is understood in America, being classified as advocates, attorneys, barristers, counsellors, proctors, serjeants, solicitors (qq.v.), etc. The function of the counsellor, or more usually barrister, is the pleading of cases in court from the data furnished to him by the attorney or solicitor in the form termed a brief (q.v.). King's counsel (abbreviated K.C.) are barristers appointed counsel to the Crown by the lord chancellor. They have the privilege of wearing silk gowns instead of the stuff gowns worn by ordinary barristers, of whom the king's counsel takes precedence, pleading cases from within the bar, while the utter or outer barristers plead beyond the bar.

COUNSELLOR AT LAW. In the United States a counsellor at law is a lawyer authorized to follow his profession and practice in the superior courts of record. The special function of a counsellor at law is to give advice as to the legal aspect of judicial proceedings, to try causes, argue motions or appeals, or conduct any other legal business that takes him into the presence of the courts. A distinction is made between counsellors and attorneys-at-law; this, however, was never strictly observed in this country, and now the two designations are used interchangeably, or in combination, in all the States but one — the title of a practising lawyer in this country being ordinarily, "Attorney and Counsellor at Law." In England, not only has the distinction in titles been preserved, but a variety of designations has been applied to members of the legal profession, according to the courts in which they practised and of which they were officers, or according to their special functions. Practitioners in the common law courts at Westminster, and also country lawyers enrolled in the Courts Leet and other inferior tribunals in the shires and boroughs, were called attorneys; practitioners in the Court of Chancery were known as solicitors, while those practising in the Admiralty and Ecclesiastical Courts and other tribunals where the civil and canon law was administered were called proctors. The titles solicitor and proctor are sometimes used by lawyers in the United States when they appear in equity suits or proceedings in the Admiralty and Probate Courts, but this is a matter of fancy and has no specific legal or customary sanction. These distinctive appellatives have been obliterated to some extent in England. According to the Judicature Act of 1873, whereby the King's Bench, Common Pleas, Exchequer, Chancery, Admiralty and Probate and Divorce Courts were consolidated, practitioners theretofore designated solicitors in chancery or proctors were to be called solicitors of the Supreme Court. Only a barrister, however, may practise as counsel in the trial and advocacy of causes in the superior courts. The initiation of law suits, the drawing of ordinary pleadings, the preparation of evidence and briefs, and attendance to all preliminaries up to the actual trial or argument in open court, are functions of attorneys or solicitors. A person qualified to become a barrister may waive a call to the bar and be licensed to practise, "under the bar," as a conveyancer or special pleader. The simplification of pleadings by the modern practice acts has effected a decline in the demand for specialists, however, and this work now generally falls to junior barristers. The highest rank among barristers is that of king's (or queen's) counsel. When engaged with other barristers in a case these counsel lead the trial, and they give opinions on questions of law submitted to them; in which respect their office is somewhat like that of the jurisconsults of Rome and of Continental Europe. Sergeants-at-law rank after king's or queen's counsel and, while the order of sergeants still exists, no new appointments are being made, so that this title will, and is probably intended to, become extinct. In the Admiralty and Ecclesiastical Courts among "the civilians and canonists," as Blackstone rather contemptuously calls them — the title corresponding to that of barrister-at-law is advocate. Counsellors, barristers, advocates, attorneys, solicitors and proctors, all alike, are officers of the courts in which they are enrolled and subject to the discipline of these tribunals. While they are not officers administering a public trust, strictly speaking, but rather officers exercising a privilege or franchise, they are, nevertheless, regarded as officers of the state with obligations to the public no less significant than their obligations to their clients.

Education for the bar has been regarded in all times and under all juristical systems as a severely practical matter. Cicero's definition of a jurisconsult — as a person "skilled in the laws and in the usages current among private citizens, and in giving opinions, bringing actions and taking security" — still holds good. Nor is the manner in which such skill was acquired in ancient Rome without its modern parallel. Every jurisconsult had in his train a number of pupils, who followed their master to the courts, listened while he was advising his clients or delivering opinions, and obtained their knowledge of legal procedure by practice, and of the usages current among merchants and other private citizens by actual contact with men and affairs. We may be sure a great deal of "sea law" was picked up by the budding jurisconsults of Rome from the Rhodian and other mariners who beached their ships on the strand at Ostia. In later days, when Ulpian and the other learned jurists, whom the Emperor Justinian commissioned to codify the *jus civilis*, had evolved a science of jurisprudence, they compiled the 'Institutes' as a compendium especially designed for the instruction of students in the principles of law. With the revival of learning, after the Dark Ages, the Roman, or "civil," law became one of the subjects of study at the universities. The University of Bologna, in particular, where Irnerius in the second half of the 11th century introduced, and lectured on, the 'Corpus Juris Civilis,' became famous as a seat of the higher education in juristic lore. The interest there aroused spread all over Europe. The emancipation of the human mind and, also, the development of the modern state were due in no small measure to this influence. One effect, however, was the arrest of the development of the body of customary Teutonic law into an independent system. In Germany the *jus civilis* became supreme and the doctors and practitioners of law there knew little but what they had learned from the Pandects. In England the propagation of the Roman law, civil and canonical, was strenuously resisted and successfully combated by the judges and practitioners in the king's courts. The Inns of Court, not the universities, became the schools for the education of lawyers in the common law, as they still are. These inns — they are really colleges — maintained by the four ancient law societies, are known as the Inner and Middle Temple, Lincoln's Inn and Gray's Inn. To each of these there are attached one or more Chancery Inns, which have the character of preparatory schools. To be admitted to practise as a barrister one must be a member of one of the law societies, and have followed a prescribed course of study at one of the Inns of Court. The method of instruction was by moots or disputations, and lectures or readings by barristers. The call to the bar proceeds not from the courts but the superior order of benchers, who are the custodians of the property of the societies and directors of their affairs, and who control the discipline of the profession. The inns, however, are subject to the visitorial powers of the judges of the superior courts. At the present time the chancery inns are used merely as chambers by barristers, to which the latter, unless they be king's or queen's counsel, are expected to admit pupils. A university training in the liberal arts or sciences is not a prerequisite to entrance as a pupil into a barrister's chambers or as a student to the Inns of Court. Until its dispersal in 1858 the College of Advocates in Doctors' Commons stood in somewhat similar relation to advocates in the admiralty and ecclesiastical courts of England that the Inns of Courts did to barristers. Advocates, however, were graduates of the universities, where they were instructed in civil and canon law.

The qualification and admission to practice of attorneys and solicitors in England, as of attorneys and counsellors in the United States, are under the direction of the courts. Usually students of law in England who do not aspire to become barristers begin by entering as articled clerks in the service of attorneys or solicitors, and a legal education there as here is obtained mainly by practical experience. In Canada the regulation of admissions to the bar rests with the Law Society of the Dominion. No person has the privilege of practising law who has not been duly admitted to the bar, and all proceedings or judgments obtained in an action brought by one unauthorized to represent litigants as an attorney or counsellor at law are ipso-facto invalidated. In courts not of record a license to practise is not necessary, though there are some exceptions to this rule. Any person, however, may appear in his own behalf in any court. In this country admission to the bar is regarded a judicial act and the right to admit, generally speaking, is vested in the courts exclusively. In the exercise of the police power of the States, however, legislatures have assumed the making of regulations, which are held binding on the courts. This has been denied in several weighty opinions, however, wherein such legislative intervention is held to conflict with the constitutional powers of the judiciary. Applicants for admission to practise in the Federal courts are required to show that they are attorneys or counsellors at law duly authorized to practise in the Supreme Court of the State where they were domiciled at the time of their admission. Good character and fair professional standing, of course, are essentials. An applicant for admission to practise in the State courts must possess the requisite ability and legal training, to test which he must submit to examination by the court itself, or by examiners appointed for that purpose. Courses of study, periods of preparation and other conditions are prescribed by rules made, usually by the Supreme Court of the State. If the unit of judicial organization is the county, as is the case in Pennsylvania where the highest court of original jurisdiction is the Common Pleas Court in each county, the rules of admission are established by this tribunal. But even in Pennsylvania the Supreme Court grants admissions to practise at its own bar, and this privilege carries with it the right to practise at the bar of any county in the State. The rules governing admissions usually require that the applicant have studied law at a recognized law school, or in the office of a practising attorney, for a minimum term of two years. Where the period of study is spent in a lawyer's office the term is in many cases extended to three years, and the student is required to file a certificate of entry when his service in his mentor's law office begins. In some States students must pass a regents' examination in the liberal arts and obtain and file a regents' certificate of proficiency before they take their examination for admission to the bar. In New York the regents' examination must be taken within three months after the beginning of the student's term of service in a law office. In some jurisdictions proof that the applicant has pursued classical studies to some extent, shortens the ordinarily required period of service in a law office. During his law clerkship the applicant must have been actually engaged in assisting in business the attorney he serves, and have studied under the control and personal direction of his preceptor. Every important university in the United States now has a law department and in many States the graduates of recognized law schools, who have received the degree of «Bachelor of Laws,» are admitted to practise at the bar without examination. This courtesy is frequently extended also to attorneys or counsellors admitted to practise in the superior courts of other States; but this rule of comity, once universal, is meeting with growing disfavor. New Jersey takes the exceptional position among the States of distinguishing between attorneys and counsellors. Only counsellors have the privilege of practising in the Supreme and Chancery courts, and no one can become a counsellor until he has been admitted and has practised as attorney for three years.

The suspension or disbarment of counsellors or attorneys-at-law, like their admission, is in the control of the courts and under their regulation. Suspension or disbarment, being judicial acts, cannot be accomplished by arbitrary procedure. There must be a sufficient cause for action and the preferment of charges and a hearing are indispensable. The conviction of an attorney or counsellor of a crime involving moral turpitude is, of course, a ground for disbarment, but suspension or disbarment may follow misconduct which is merely unprofessional and does not constitute an indictable offense. The legal profession itself assumes disciplinary powers over its members and almost every county bar association maintains a complaint committee, to which charges made against members of the local bar are referred for investigation and eventual prosecution. A long step forward was taken in professional self-discipline when the Alabama State Bar Association in 1898 adopted a ‹Code of Legal Ethics.› This was reprinted with obvious approval in 118 Georgia Reports. On 27 Aug. 1908, finally, the American Bar Association at its annual meeting approved and adopted a ‹Canon of Ethics› in 31 articles, of which the following is an epitome: (1) It is the duty of counsel to maintain toward the court a respectful attitude; (2) Members of the bar should prevent political considerations from outweighing fitness in the selection of judges; (3) Counsel should not exert influence on the court by marked attentions, unusual hospitality, etc., toward judges, which are uncalled for by the personal relations of the parties; (4) A lawyer assigned as counsel to an indigent prisoner should not ask to be excused for trivial reasons, but protect the interests thus committed to him to the best of his ability; (5) It is a right of a lawyer to undertake the defense of a person accused of crime, regardless of his private opinions as to the guilt of the party; the primary duty of a public prosecutor is not to convict but to see that justice is done; (6) A lawyer must disclose at the time of his retainer all circumstances of his private relations to the parties, and any interest or connection he has with the controversy, such as might influence a client in the selection of counsel. To represent opposing interests, except by the express consent of all parties, is unprofessional; (7) Lawyers jointly prosecuting or defending a cause and failing to agree must state their differences to their clients and leave the matter to the latters' decision. The suggestion of a client to call in other counsel is no ground for offense; (8) Lawyers should endeavor to obtain full knowledge of the facts of a case before advising thereon and are bound to give candid opinions of the merits and of the probable results of contemplated litigation; (9) A lawyer should not communicate on a subject of controversy with an opposing party who is represented by counsel, nor should he in any manner mislead a party not so represented; (10) A lawyer must not acquire any pecuniary or other beneficial interest in the subject matter of a litigation in which he is taking part; (11) When money or trust property comes into the hands of an attorney the fact should be promptly reported to his client; the same must not be commingled with the attorney's private property or used by him; (12) Lawyers should avoid making charges for services which overestimate their value, as well as such as underestimate the same; a client's ability to pay does not justify excessive charges, though a client's poverty may require a smaller fee to be demanded; (13) Contingent fees, when sanctioned by law, should be under supervision of the court; (14) Controversies with clients concerning compensation should be avoided and suits to recover the same resorted to only to prevent injustice, imposition and fraud; (15) It is not the duty of a lawyer to do unscrupulously whatever may enable him to win a client's case: it is improper for a lawyer to assert in argument his personal belief in the innocence of a client or the justice of his cause. No fear of judicial disfavor or public unpopularity should deter a lawyer from the full discharge of his duty, but the great trust of a lawyer is to be performed within, not without, the bounds of the law. No violation of law, no fraud or chicane, is demanded of him for any client, however powerful or influential. The lawyer must obey the dictates of his own conscience; (16) A lawyer must restrain and prevent his client from doing things which he himself ought not to do; (17) Ill-feeling between litigants should not influence counsel in the conduct of a case. All personalities between counsel should be scrupulously avoided;

(18) Adverse witnesses and suitors should be treated with fairness and consideration; a lawyer must never minister to the malevolence of a client; (19) When a lawyer is a witness, except with regard to merely formal matters, he should leave the trial to other counsel; (20) Newspaper discussion by lawyers of pending litigation is condemned; (21) Punctuality is a prime duty of a lawyer; (22) Conduct before a court must be characterized by candor and fairness. To knowingly misquote documents or the oral testimony of witnesses, or the language or argument of opposing counsel, is unprofessional and dishonorable. So also is the getting before a jury, in the form of argument, testimony that would be excluded as objectionable; (23) Fawning or flattery of a jury, or pretended solicitude for their personal comfort, is unprofessional. So also is conversation with jurors privately about a case either before, during or after the trial; (24, 25, 26) Condemn refusal to extend professional courtesies to opposing counsel when no harm can be done thereby to a client's interest; condemn the taking of technical advantage of the trustfulness of opposing counsel, the repudiation of unwritten agreements with regard to the incidents of a legal proceeding and other sharp practices; (27) The publication of ordinary business cards is not improper, but solicitation of business by circular or advertising, or through touters, or by inspiring newspaper comment, which magnifies the importance of the services of the advertiser or of the cases in which he is engaged, are denounced as unprofessional; (28) Stirring up litigation directly or through agents is not only unprofessional but indictable at common law; (29) Lawyers should expose corrupt or dishonorable conduct in the profession and accept employment unhesitatingly against an attorney who has wronged his client; (30) A lawyer must decline to conduct a cause or make a defense the purpose whereof is merely to harass the opposing party or work oppression; (31) No lawyer is obligated to act either as adviser or advocate for every person who may wish to become his client. Consult 'Corpus Juris' (Vol. VI, p. 556, under title «Attorney and Client,» §§ 1–121); Carter, 'Ethics of the Legal Profession' (1915); Costigan, G. P., Jr., 'Cases and Other Authorities on Legal Ethics' (Saint Paul 1917); Loftie, W. J., 'Inns of Court and Chancery' (London 1895); Home, G., and Headlam, C., 'The Inns of Court' (London 1909).

STEPHEN PFEIL.

COUNT (Lat. *comes*) appears to have been first used, as a title of dignity, under the reign of Constantine. During the existence of the republic the inferior officers as *tribuni, præfecti, scribæ, medici, haruspices, accensi præcones,* who accompanied the *proconsules* and *proprætores* into their provincial governments, were known as the *comites* or *cohors* of their provincial. On the establishment of the imperial government the name was applied to the court and household of the prince; and Dio (53) mentions a council of senators selected by Augustus as his *comites*. On the first distribution of his dominions, and the foundation of the new capital by Constantine, 10 out of 35 provincial generals received the title of *comes*. After the fall of the Roman power the title was retained by the conquerors; and under Charlemagne it denoted equally a military or civil employment. About the end of the 15th century, in Germany, and under the last princes of the Morovingian race in France, the title appears to have become hereditary in families. The institutions of the ancient German tribes may have contributed much to the establishment of this class of nobles. In early times, before the existence of the Latin *comites*, the Germans had officers chosen, at least in some tribes, by the people. These were a kind of inferior judges. After the Franks became the ruling nation they made a change in their character. The king now appointed them, and they exercised jurisdiction over certain districts in the king's name, with the title of *grafen*. These ancient officers are perhaps as fairly entitled as the *comites* to be considered the root of the subsequent counts. The German title *graf* corresponds to the title «count» in other countries of Europe. These *grafen* superintended the administration of justice, the police and the taxes. After the time of the Carlovingian dynasty different classes of counts or *grafen* were formed; thus *pfalzgrafen*, or *comites Palatii*, the judges of the court who decided whether a case should be brought before the king; *markgrafen*, counts of the frontiers; *holzgrafen*, counts of the forest, that is, inspectors, etc. These royal officers soon usurped power which did not belong to them, and treated the people so badly that the emperors and kings were obliged to go themselves into the provinces and hold courts, or to send particular officers for this purpose, called *sendgrafen*. The sheriffs in England were originally the deputies of the English counts or earls, who correspond to the German *grafen*. The wife of an earl has been called «countess» from very early times. Their Latin title is still *vice-comes*. Their English title, derived from «shire» and «gerefa,» has the same origin with the German *graf*. (See SHERIFF). In the 12th century the division of counties on the continent of Europe was abolished, and thus the counts lost their jurisdiction, except on their own possessions. In point of rank, the English earls are considered as corresponding to the continental counts. In Italy a large number of landed counts were created, but they are no longer recognized by the government. In Spain the title is still of value owing to the existence of primogeniture. In the Russian monarchy the title of graf bore little social prestige. In present times, the Japanese use the word to translate a similar rank in their country. (See COUNTY; EARL; TITLES OF HONOR). Consult Selden, 'Titles of Honor' (London 1672); Luchaire, 'Essai sur l'origine de la noblesse en France au moyen âge' (Paris 1902); Brunner, 'Deutsche Rechtsgeschichte' (Vol. II, Leipzig 1892).

COUNT OF MONTE CRISTO, The. A typical novel of the romantic period in France was 'The Count of Monte Cristo,' by Alexandre Dumas, written from 1841 to 1845 with the assistance of two minor collaborators, Auguste Maquet and P. A. Fiorentino. It was begun before and completed after the equally famous 'Three Musketeers,' from which it differs in being more melodramatic and intense, less natural and humorous. The protagonist, Edmond Dantès, bears the earmarks of the romanttic hero of the Byronic poems, although he is not so sentimental, being endowed with an active passion that sets him wrestling with superhuman difficulties instead of brooding over them in sick despair. Dantès is the victim of unscrupulous enemies, a gloomy giant outraged by society. Unjustly confined within the dungeons of the Château d'If, he learns from a fellow prisoner the arts and sciences, and the secret of a buried treasure. When his companion dies, Dantès, assuming the rôle of the corpse, is flung into the sea and swims to freedom. He recovers the lost treasure, and, as the possessor of immense wealth, proceeds to work out his elaborate schemes for mysteriously rewarding those who have been his benefactors, and wreaking vengeance upon those who are responsible for his misfortunes. He is ruthless in his pursuit of these enemies, insinuating himself unsuspected into their good graces, and leading them on by diverse paths to destruction. Fernand, who had married Dantès' sweetheart, is brought to suicide; Danglars, who had permitted the father of Dantès to die of starvation, is forced into bankruptcy and social disgrace; and de Villefort, who had treacherously secured the imprisonment of Dantès, is publicly humiliated, and when his criminal wife slays herself and her son, he goes raving mad. With his thirst for revenge thus slaked, Dantès turns for solace to the fair Haydee, daughter of Ali Pacha, ruler of the Greeks.

Duels, poisonings, sleeping potions that induce the semblance of death, documents written with invisible ink, secret passages, luxuriously furnished grottoes, disguisings, and all the other paraphernalia of hectic romance are mustered here for duty. Villainy and virtue are extreme; demons and angels rub shoulders. Slaves, bandits, bankers, soldiers, sailors, priests throng the pages, every one of which yields its thrill.

In power of improvisation, Dumas vies with Walter Scott; and in wildness of imagination far surpasses him. The intricate plot of the novel is woven with consummate skill, and, theatric as are its scenes and personages, they win at least that temporary suspension of disbelief which Coleridge would exact of all romance. Indeed, in many matters of detail, Dumas has taken care to arouse in his reader, not only the pleasure of surprise, but that also of recognition. Thus, in his account of the ingenuity of the Abbé Faria in fashioning various articles for use in the dungeon, he has torn realistic leaves from 'Robinson Crusoe.' Features of the intrigue he drew from Peuchet's 'Police dévoilée' after his publishers had asked an exciting story in the style of Eugène Sue's 'Mysteries of Paris.' The Roman scenes he completed before it occurred to him to develop fully the incidents connected with Marseilles and the Château d'If, now so auspiciously setting the story in motion. The location of the buried treasure and the title he hit upon during a visit, in 1842, to Elba, off the coast of which he noticed the rocky island of Monte Cristo. Translations and dramatizations of the romance have appeared in every modern language.

FRANK W. CHANDLER.

COUNT OF PRESIDENTIAL VOTES. See ELECTORS, UNITED STATES PRESIDENTIAL.

COUNT ROBERT OF PARIS, a novel by Sir Walter Scott, published in 1831. The scene is laid in Constantinople during the reign of Alexius Comnenus (1080–1118). Many historical facts are altered for artistic effect.

COUNTER-IRRITATION, the production of an artificial inflammation in order to relieve another in some other part of the body. The principal counter-irritants are dealt with in the article on blister (q.v.).

COUNTER REFORMATION, a movement that assumed importance in the Roman Catholic Church in the 16th century, and lasted from 1560 in the pontificate of Pope Pius IV to 1648, the end of the Thirty Years' War. Before the Protestant Reformation the synods and provincial councils of the Church had always considered and acted upon points requiring reform. Luther, as a Catholic priest, emphasized the urgent need for further reforms of abuses which were creeping into the Church. When he seceded and became a Protestant, the reformation movement in the Catholic Church continued, growing in its formidable aspect to a more or less definite and avowed attempt to counteract the Protestant Reformation. It was an inevitable outcome of the very conditions that produced the great schism. Among those who shared the widespread discontent with existing abuses in the Church and who longed for a return to its apostolic purity and simplicity, there were many who remained loyal to the parent communion and believed in the possibility of an internal reform. There were others whose piety and sincerity of motive were more questionable, but who from wise policy advocated an amendment of life and doctrine, perceiving that moral and not physical force was required to keep wavering adherents within the Church's pale and to regain those who had broken away. The Council of Trent was one of the most prominent of the factors in the problem counteracting the spread of the Reformed faith. Conciliatory measures which were originally intended were abandoned after the fifth session and attention was concentrated on the reaffirmation of doctrines questioned by the Protestants and on regulations for the purification of the Church. Although Macaulay's estimate of the Jesuits' share in the Counter-Reformation is exaggerated, the devotion and zeal of Loyola and his followers undoubtedly played a large part in the abatement of ecclesiastical scandals and abuses. The Jesuits perceived that in an age of intellectual ferment and inquiry the Church must control the education of the better classes if she would retain her spiritual influence with them, and in the perfectly organized Society of Jesus they offered her an instrument fitted for the task. The representative and punitive features of the Counter-Reformation as illustrated by the work of the Inquisition (especially in Spain and in the Netherlands), and by force of arms, banishment, confiscation and other political penalties, are familiar, being more frequently dwelt upon than the changes taking place within the Church. Consult Pennington, A. R., 'History of the Counter-Reformation' (London 1900); Ward, A., 'History of the Counter-Reformation' (New York 1889); Wiedemann, 'Geschichte der Reformation und Gegenreformation' (Enns, 5 vols., 1879–86).

COUNTERFEITING, the making of imitations or counterfeits of money, either paper or coin,— in an extended sense including some degrees of forgery and other cases of fraudulent imitation, as spurious trade-marks or dies. This is a crime heavily punishable by statute, and the United States government has legislated at considerable length for its suppression. The punishment prescribed for imitating United States paper money is a fine of not over $5,000 and imprisonment at hard labor not exceeding 15 years; for counterfeiting coin, the penalty is a fine not over $5,000 and imprisonment at hard labor not exceeding 10 years; for minor coins of five cents and less, $1,000 fine and five years' imprisonment is the maximum. For having counterfeit money or counterfeit tools in possession, or for counterfeiting post office locks, or for altering or reusing revenue stamps, similar penalties are prescribed by statute. The United States laws on the subject may be found in the Revised Statutes, §§ 5413 et seq.

For the suppression of counterfeiting and enforcement of the laws on the subject, the United States has been divided into 10 secret-service districts, in each of which officials are constantly working to detect passers of counterfeit money and ferret out those who are engaged in its manufacture.

The paper money of the United States has been rendered very difficult of imitation by reason of the high character of the workmanship employed. The paper used includes colored silk threads, and as the manufacture of such paper for other purposes is prohibited, the counterfeiter must either control a paper mill, involving a very heavy investment, or must steal some government paper, or imitate the colored threads with colored lines written or printed. Pen-written lines are the usual form of imitation of these, commercial paper being employed, the nearest to the government paper that the counterfeiter can buy. The engraving of the plates is of such high quality that there are usually not a dozen men in the country, outside of those engaged on the goverment notes, who are capable of executing good imitations, and these men are known to the secret-service, which keeps an eye on them and their associates. The printing is done in colored inks in order to prevent reproduction of the plates by photography, which would be comparatively easy if printed in black. These conditions, combined with excellent work by the secret-service, have almost stopped the counterfeiting of United States paper money, and the temptation to counterfeit is still further reduced by the government's policy of changing the designs of the notes frequently and withdrawing the old paper from circulation, rendering it certain that a high-class counterfeit would be driven out of circulation in a short time.

The success of counterfeiters is not so much due to the cleverness of their work as it is due to the ignorance and carelessness of the general public. A man who is not familiar with the distinctive ear-marks on the genuine money of the land cannot be expected to detect the counterfeit presentment of them when they face him on spurious money; so that every man ought to make himself familiar with these distinctive ear-marks of real money — and he must do so if he would successfully protect himself against the skilful imitations and the cunning devices of the shrewd counterfeiters who infest the land and prey upon this species of popular ignorance.

Steel-engraving is a fine art, about which the general public knows next to nothing; and yet the possibility of detecting counterfeit paper money unerringly is bound up in the engraved features of its make-up. Of course, it is not contended that everyone must become a master of the engraver's art before he can successfully detect counterfeit money; but it is contended that he must make himself so familiar with the distinctive features of the genuine machine-engraving on the national currency that he can distinguish it from spurious and imperfect imitations of it. Nor is it a very difficult task. It can be done by anyone who will take the trouble incident to a proper study of the subject. The work executed by the government, as well as that which is executed by the banknote companies, possesses great beauty in its art and exact perfection in its execution and finish. It is mathematically and geometrically exact in all its parts, while the spurious work of imitating counterfeiters is necessarily imperfect in these respects.

This is due to the fact that the former is done by machinery, while the latter is done by hand; and to the further fact that hand-engraving, even when aided by simple machinery, can never approach the beauty, exactness and general perfection of machine-engraving. And yet although these very designs have bound up in them the chief safeguards which the government has thrown around our national currency to protect it against being successfully counterfeited, not one man in any 10 met upon the streets of our cities, much less among the rustic tillers of the soil, is familiar with either the character or the object of these beautiful designs which are found upon our national currency. This fact is very aptly illustrated by the tests which are applied by different persons to determine whether a suspected note is spurious or genuine: one looks carefully for pen-holes; another scans it for signs of wear, and another scrutinizes the vignettes, while others examine the paper,— not knowing that all of these evidences may be counterfeited successfully or imitated so perfectly as to deceive almost anyone; but very few, if any, apply those real tests which involve the only truly and unmistakably distinctive features of genuine notes. Hence, the alarming success of counterfeiters in passing their spurious products is not so much due to the fact that the excellence of their imitations of these distinctive features of genuine notes is prone to deceive the intelligent observer as it is due to the fact that the general public is ignorant concerning the construction, purpose, character and distinctive features of that difference which distinguishes the genuine from the spurious. Everything on the average national currency note, except the fine lines of engraving, may be successfully counterfeited; but these fine lines defy all impostors. All of the circles, ovals, squares and parallels, as well as the geometrical lathe-work upon which the denominations are usually placed, are composed entirely of a perfect network of finely engraved lines which cross each other at such angles or approach each other at such distances as to produce the desired effect. These finely engraved lines constitute the chief, the distinguishing feature of the government's money-engraving, and they cannot be successfully counterfeited.

It will be noticed in all genuine work that these fine lines can be traced by the use of a lens, throughout the figures,— not a line being broken, not a line losing itself in another line and not a line showing any irregularity whatever in its course, in its uniformity of curve and width or in its degree of shading. These lines may be either white upon a background of black, green or red; or they may be black, green or red upon a background of white; but they are always exact, always even and always uniform. They are made by a geometrical lathe which was invented by one Asa Spencer and introduced to the public about 1818.

This lathe is a perfect wonder; it produces patterns of almost every conceivable variety in form and figure; but this same fine quality of the lines clings to them in whatever form they may appear. So that, when it is remembered that this uniformity and uniqueness of execution is impossible in hand-engraving, the spurious note falls all to pieces under this test. The striking difference between the genuine and the spurious is very natural from the simple fact that the one is mathematical and exact, while the other is mechanical and necessarily varied. The lathe does not engrave directly upon the note-plate, while the counterfeit engraver does. The lathe engraves upon a piece of soft steel one-eighth of an inch thick. After this piece of soft steel has been properly engraved by the lathe, the piece of engraved steel is hardened by a peculiar process; then (by means of a powerful machine called a transfer press) a cylinder of soft steel is rolled over the hardened piece of engraved steel in such a manner that the engraving is transferred to the cylinder, which is then hardened; and, from this hardened cylinder the designs are transferred to the note-plate by means of the transfer press. In this way the work is not only exact — mathematically exact and artistically perfect — but it is always uniform; for this cylinder acts as a perpetual model from which any number of plates can be transferred — each being an exact facsimile of all the others taken from that same cylinder. Hence all United States notes of any one series are exactly alike in every respect — except the numbers and the signatures. And right there is where the counterfeiter falls down before the practised eye. He must do his engraving directly upon the note-plate — which imposes many insuperable difficulties; the lines cannot be made as perfect as they are in this lathe work, and the general effect of the printing is inartistic in comparison with the impressions taken from lathe-made plates. Even to the naked eye the appearance is more or less dull and sunken, or scratchy; and the figures are sure to be lighter or darker in spots, as the lines are heavier or lighter in places. The use of the lens in such cases discloses the fact that the lines are often broken, varied or irregular, either in size or course. Besides, it being impossible for any hand-engraver to produce two dies exactly alike, it happens that the spurious dies are not only not exact reproductions of the genuine lathe-made dies, but no two of the spurious dies are exactly alike; so that comparison, under the lens, between the dies on a suspected note (if it be spurious) and a genuine note brings out this difference so clearly that very little skill is required to detect and read it.

All the government dies used in printing any given series are exactly the same — all being transferred from the same cylinder, and they must therefore be exactly the same in every respect. This impossibility of making two dies separately and independently exactly alike by the hand-engraving process not only prevents the counterfeit dies from being like the genuine, but it also prevents any two counterfeit dies from being exactly alike, since the plates must be separately and independently engraved. But besides this absence of exactness in the reproduction of the dies, there is another notable feature of difference which is conspicuous for its presence in the genuine and for its absence from the spurious note; and that is the beautiful clear-cut, raised impressions produced by the correct and uniform lines of the lathe-work which the counterfeiter cannot reproduce to save his life.

This machine work is therefore the safest ear-mark there is for detection purposes; but it must be used intelligently. In examining this work on any suspected note, it is a pretty safe way for the examiner to begin at the centre of the curvilinear figures and then gradually follow the lines around the circles, one within another, carefully searching for any special defects and for the discovery of any irregularity not patent to the naked eye. And he should also make careful and minute comparisons between the general designs on the genuine note and those on the suspected one.

Sometimes the whole face of a note (except the vignettes and dies) are tinted a pale red or some other color; but examination under a lens discloses the fact that this tint is composed of fine crossed or looped lines running clear across the face of the note. This is another species of machine work which is but poorly imitated by the most expert counterfeit engraver who has to depend upon his hands. This work, when genuine, shows the lines to be perfect in execution and in shading, while the spurious note bears evidence of imperfection in both respects.

Parallel lines also afford a check. They are made by a parallel-ruling machine, which is governed by an index to regulate the width of the lines, and they are mathematically exact. They are always uniform, always regular and always exactly parallel — conditions which do not obtain when the counterfeiter undertakes to reproduce them by the process of hand-engraving. These parallel lines are used in shading the letters and figures on the genuine notes into a perfectly even pale gray. They are also used to represent a clear sky or water; but crossed lines are used to represent cloudy or heavy skies. In genuine work these lines can always be counted, while such is not always the case with counterfeit notes, as the lines on them are often broken, blurred and irregular.

Some people rely on the vignettes as reliable ear-marks for detection purposes; but they make a mistake in doing so. The vignettes are the most artistic part of the whole note, and they are mostly hand-engraved, even on the genuine notes; so they may be almost perfectly imitated or reproduced — but that is not often the case. The vignettes on the national currency are made by the very finest artists in the country, and they are beyond the successful imitation or reproduction of any one but an artist of the first water; and, since the salaries which such artists can command at legitimate work are too satisfactory for them to resort to the rather risky business of counterfeiting themselves or lending their talents to others engaged in that hazardous outlawry, these would-be imitations are made by rather inferior artists and are necessarily imperfect in many respects. Real vignettes have this advantage over spurious ones: They are never made but once, and are therefore uniform and always exactly the same. They are transferred to the cylinder, just as the lathe-work is, and then transferred (by use of the transfer press) from the cylinder to the note-plate, thus using one model all the time; but such is not possible with the spurious vignettes. They must be reproduced, and exact reproduction is very difficult, if not impossible. But, it being noticed that counterfeiters get along better in reproducing outdoor scenes than they do in reproducing portraits, the government has very wisely mingled its vignette work — making them consist of outdoor scenes, historical pictures, portraits and allegorical figures, which it not only becomes difficult for counterfeiters to imitate, but which furnishes a somewhat graduated scale of difficulties for them to surmount.

The engraving test is the best possible earmark in the detection of counterfeits, for two very good and sufficient reasons: In the first place, the above-noted differences will always appear as long as counterfeiters have to rely upon hand-engraving while the government uses machine-engraving; and, in the second place, these counterfeiters will always have to rely upon hand-engraving, because machines for the purpose are too bulky and too expensive for them to handle,— considerations which will always place machine-engraving beyond their reach. If a man has $75,000 to $150,000 capital (the cost of a proper outfit of machinery for this work), he would hardly risk its investment in an illegitimate enterprise which might be swooped down upon at any moment by government officers and utterly destroyed, with the legacy of a long sentence in the penitentiary added. Hence, it may be pretty safely assumed that all the engraving done upon spurious note-plates will always be done by hand, and that this test can always be applied.

Coin is more easily counterfeited. The government mints it by subjecting blanks of metal to heavy pressure between dies. The cheap imitator casts them under slight pressure in a base metal. The maker of a better grade of counterfeit coin cuts out or casts a blank or disc of the required size, and compresses it between dies in an ordinary stamping-press. To make a really good imitation of gold coin requires a very wide knowledge of alloys, possessed by very few men, and principally for this reason counterfeit gold coins are scarce. The imitation of silver is much easier, as there are in the market numerous metals, used in the manufacture of tableware, etc., that closely simulate silver. Their principal basis is lead, and it is by the softness of the mixture and its increased weight that counterfeit silver is most easily detected. It does not require an expert to distinguish the average counterfeit silver coin from the genuine, as a simple balancing on a scale with a good coin shows the difference in weight, a shave with a penknife exhibits the softness of the metal, and ringing the coin produces a dull sound as compared with the ring of silver.

Counterfeits made in real silver have been circulated since the value of the metal deteriorated, and these, if well made, are very difficult of detection. The government's principal safeguard against them is obtained by watching all purchasers of silver, and following up those who do not seem to have good reason for requiring it. The imitations of five-cent pieces in the real metal are not difficult for a skilled mechanic, and the statement has been widely circulated that they were once actually manufactured by convicts while serving sentence in a prison of one of the larger States, where nickel-plating was carried on in the workshop. The more common imitation of the five-cent piece, however, is simple lead, cast in a mold, and, while easy of detection, it secures circulation because the passers handle it without examination. This is the most usual form of counterfeiting carried on to-day, and a flood of bad nickels is liable to break out anywhere as the result of some misguided man's efforts. As soon as they attract attention in a locality the secret-service men concentrate their action, and usually find the base of supplies within a few months, unless the counterfeiters take the alarm and fly, destroying their apparatus.

The most elusive counterfeiter the United States secret-service men were ever called on to unearth was a New Jersey mechanic skilled in photography and the use of the pen and brush. For many years he patiently imitated $20 greenbacks by hand, making about one a week, and then going to some New York saloon to change it. His work was very artistic, and he could surely have made more money by legitimately employing his talent in the trades. He was finally caught passing a note, and sentenced, the almost invariable fate of every persistent counterfeiter.

COUNTERMARK, in numismatics, the name given to those stamps or impressions which are found on ancient coins or medals, and have been given since their first impress. These countermarks or stamps are often executed without any care, and frequently obliterate the most interesting portion of the original inscription. There have been various opinions respecting the cause of these countermarks; some antiquaries thinking that they were to indicate an augmentation of the value of the money upon which they were stamped; others, that they were vouchers for workmen; and, again, that they were only struck upon money taken or received from foreign enemies. During the long war with revolutionary France Britain stamped millions of Spanish dollars with small, oval countermarks of the head of George III upon the neck of the Spanish monarch. Many of them were completely restamped or countermarked in the mint, but the new impression sometimes failed to obliterate the old entirely.

COUNTERPOINT (from Lat. *punctum contra punctum*, point against point) in music, is the art of combining melodies, or more correctly of adding melody to melody. The origin of the word is more nearly approached when to a given theme the melody added is called its counterpoint. In former times musical sounds were represented by dots or points placed on the lines, and the added part or parts were written by placing the proper points under or against each other — *punctum contra punctum.* Some authorities use the word counterpoint simply as an equivalent of harmony, by others it is employed to denote the art of composition generally. It is preferable to apply this term now to that branch of the art which, a musical thought being given, teaches the development of it, according to the laws of the art, by extension or embellishment, by transposition, repetition or imitation throughout the different parts. Contrary motion, augmentation and diminution, the latter two referring to the time-value of the notes, are also other devices of counterpoint. It thus stands related to harmony as literary composition stands to grammar. *Simple counterpoint* is the art of adding a part or parts to a given melody in notes all of equal time value, as in plain-song or ecclesiastical style. *Florid counterpoint* is when the notes of the added parts are of less time value (say two crochets or four quavers against a minim) than those in the melody or subject, as it is called. *In double counterpoint,* the subject may start in the bass and be repeated in the upper part, or vice-versa. It becomes triple or quadruple when two or three parts are added with the harmony inverted. Further, counterpoint is divided into the free and strict styles, the former, which is of the florid order, allowing many licenses as to discords, etc., not permitted in the dignified slow movement of the strict style. The fugue (q.v.) may be classed among the highest developed forms of the art of counterpoint. It has been said that the art was known as far back as the 4th or 5th century; others again ascribe its invention to Guido d'Arezzo in the 11th century, or Adam de la Hale two centuries later. It was not until the 17th or 18th century that the art attained its maturity under the fostering care of Palestrina, J. Sebastian and Emmanuel Bach, Handel, Haydn and Mozart. Beethoven's avowed aim in his later works to make every part sing, and not to be mere harmonic padding, well illustrates the object of counterpoint, while among the greatest contrapuntalists and innovators of modern times are Wagner and Brahms who by their intensive utilization of overtones practically extended the field of counterpoint and harmony. Numerous treatises on counterpoint exist; among the best modern authorities are Prout, Richter, Riemann and Jadassohn. See HARMONY.

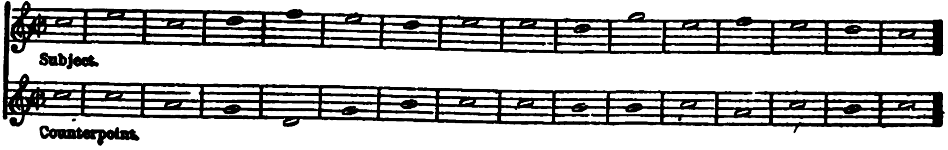
COUNTERSIGN, in military affairs, a watchword used to prevent unauthorized persons passing a line of sentries, whose orders are to stop any one unable to give it. It is fixed each day by the commanding officer, but may be changed at any moment if necessary, and is communicated only to those entitled to know it. The parole is a similar watchword given only to those entitled to inspect guards and to their commanders. Countersigns are usually names of battles; paroles are names of distinguished military persons. To give a countersign or parole other than that received, or to make a countersign or parole known to one not entitled to receive it, is in time of war punishable by death, or such other punishment as a court-martial may determine, according to the 7th Article of War, United States Army.

COUNTING-OUT GAMES. See GAMES.

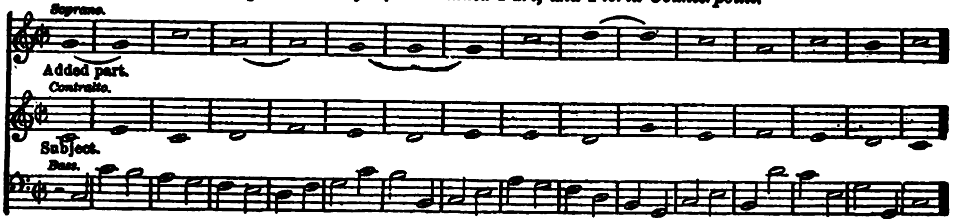
COUNTRY- or CONTRA-DANCE, a dance in which as many couples can take part as there is space to accommodate them; the gentlemen being ranged at the commencement on one side, and the ladies on the other. The dancers are constantly changing places, leading one another back and forward, up and down, parting and uniting again. «Sir Roger de Coverley» is the best-known example. The oldest collection of country dances was published in 1651 under the title 'The English Dancing Master.' In the 18th century it was introduced into France, where it was first known as «Anglaise.» It was also known as the «Contredance.» Under this name it spread to Germany.

COUNTY, in the United States, an administrative subdivision of each State, intermediate between the body as a whole and the town, parish or municipality In the North (except the wild northern parts of Maine and New Hampshire), and the thickly settled States of the central West, it is an aggregation of actual towns, there being no county land which is not a part of some town. In the South and the more sparsely settled Western States, the town is a piece cut from the county, the greater part of which may be entirely unorganized, except as divided by the State into artificial sections for administrative convenience or the saving of future boundary disputes; townships (as also in Aroostook County, Me.), military districts as in Georgia, «wards» as in Louisiana, «beats» as in Mississippi, etc. The relations of the county to the political and social life of the community also vary widely in different sections, owing to historic development. In New England it is of less consequence than anywhere else in the United States: a mere artificial group of towns, which might be regrouped at any time with little disturbance. Here it has three commissioners, who act as its attorneys and representatives, as well as executive officers, apportion the taxes among the towns, care for highways, etc. The old militia regiment, of which the town train-bands were companies, has disappeared; the County Court has been replaced by sessions of the State Superior Court on circuit; there are, as of old, a sheriff, courthouse, and jail, a Probate Court, registry of deeds, etc. The representative system here is not based in the least on the counties, but on the towns in general, singly for the lower house in the State, and grouped into «senatorial districts» for the upper. Hence there is but languid interest in county matters, and no feeling of county unity. But in the Middle and Southern States the county is a much more integral part of daily life; it is the basis of representation, and often the real unit of growth and settlement. In the Middle States the towns were the original centres of settlement, as in New England, but they have not reduced the counties to insignificance; on the contrary, the county-seat is usually the chief centre of business and political interest, and the coveted spot at which to edit a newspaper sure of the largest circulation — in New England the county-seat has no advantages as such to make it a newspaper focus, and frequently is an insignificant

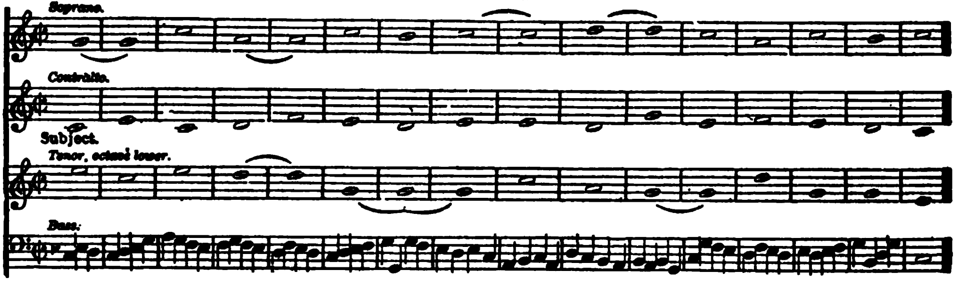
Example I.—Subject, with Simple Counterpoint.



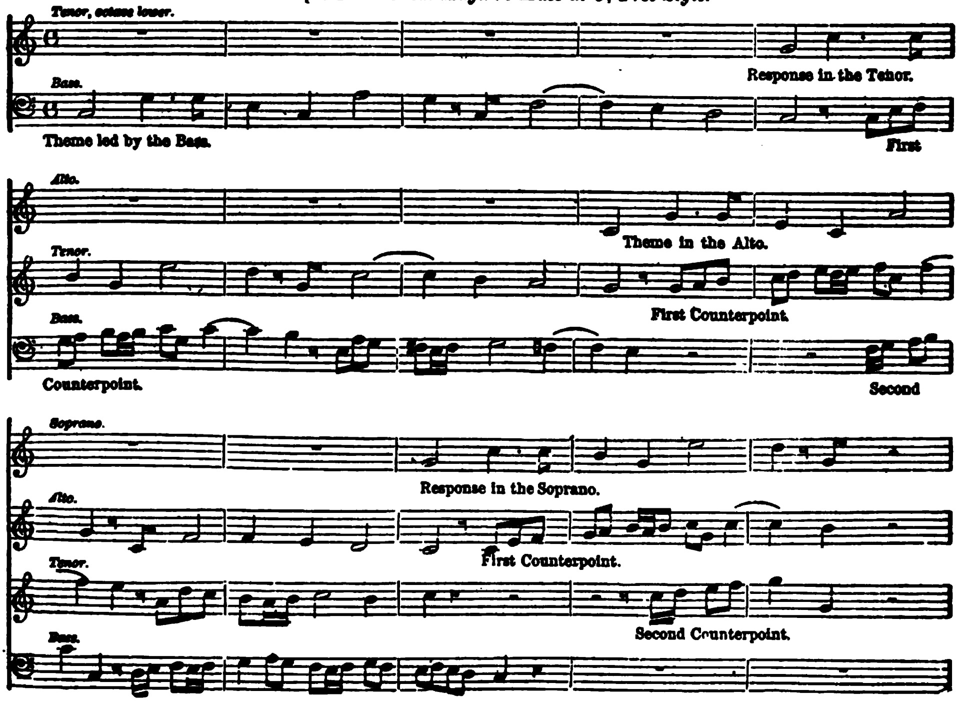
Example II.—Subject, with added Part, and Florid Counterpoint.



Example III.—Florid Counterpoint, in Four Parts.



Example IV.—From Haydn's Mass in C, Free Style.



place where none is published — and the county meetings of the town boards of supervisors determine the important actions of the county population. In the South, generally, the county was originally not only the most important, but almost the one subordinate unit of settlement, owing to the paucity of towns due to the plantation system. The county regiment, instead of being made up of town companies, was divided into district bands for convenience of drill and assemblage; the local management was mainly by county instead of town officers; the magistracies were mostly self-perpetuating, in the hands of a few leading families, instead of being elective or even appointive. The very settlements intended for towns often did not grow into such, but spread into disconnected plantations, and became counties; as James City County and Charles City County, Va. In South Carolina there were two systems — the county in the low country, the district in the Piedmont region; after the war the district system was extended over the whole State; in 1868 it was abolished and the whole State divided into counties. But these are purely artificial creations, and not even created with good judgment; they are of immense size, nearly double those in Massachusetts or Connecticut, and treble those in Virginia or Kentucky; Charleston County is larger than Rhode Island. They have no courts, being grouped into judicial circuits. The real subdivision seems likely to take place within them. In Louisiana the corresponding divisions are called parishes instead of counties. The institution was brought from England by the first settlers: the county there was an old tribal settlement, sometimes a whole kingdom as in Kent, the counties or shires being gradually fused into the kingdom. The shires are therefore not divisions made in the kingdom, but small governments whose coalescence made the state. The name "county" was given them after the Norman Conquest, from their likeness to the counts' governments on the continent. At first here the English organization was copied: there were courts called quarter-sessions, justices of the peace with extensive powers, lieutenants, coroners or "crowners," etc. Virginia had the county in 1634, Maryland in 1638, Massachusetts in 1643. Consult Fiske, 'Civil Government in the United States' (1890); Pollock and Maitland, 'History of English Law' (Boston 1899).

COUNTY ASSESSOR, a public official generally elected by popular vote for terms of two or four years in southern and western States, to value all property liable to taxation. They prepare lists of owners and descriptions with valuations of property, supervising and equalizing such assessments where the original assessment is made by town officers. In Wisconsin and Indiana a county officer is appointed to superintend and instruct the town assessors. In Illinois and Ohio similar duties are performed by one of the other county officers. In Kansas town assessors have been superseded by county assessors who make the original assessment. See TAXATION.

COUNTY BUDGETS. See BUDGETS, AMERICAN; APPROPRIATIONS, AMERICAN SYSTEM OF.

COUNTY COMMISSIONERS, officials appointed on boards, usually consisting of from three to seven members, to deal with specified matters of administration in each county, of approximately half of the States in the Union. County Courts or board of supervisors perform like duties in other States. The duties of county commissioners, generally, are to control public finances, superintend county roads and other public works, and poor relief. Some county commission boards supervise police, township and other county officers and possess a limited ordinance power. In western and southern States they often license peddlers, saloons and other businesses, and establish county precincts and polling places. Experience indicates that more efficient administration is exercised by small boards of county commissioners compared to large boards of supervisors. The combination of taxing and spending facilities, however, always creates criticsm, and caused Indiana to establish a county council in 1899 to control the boards of county commissioners. See COUNTY COUNCIL.

COUNTY COUNCIL, a body of officials, comprising a specified number elected from each district and by the county, to control revenue and expenditure. The first county councils in the United States were established in Indiana in 1899, each to consist of seven members, four elected by districts and three at large. They are empowered to borrow money and issue bonds, and make appropriations for county expenses, the boards of county commissioners (q.v.) being the executive authority to carry out orders.

County councils in England and Wales date from 1888 when these territorial divisions were, for various purposes, divided into 63 counties with elective administrative bodies known as county councils. The new administrative counties were given the same boundaries to correspond as closely as possible with the 52 historical shires or counties, but seven of the latter, Sussex, Suffolk, Hampshire, Cambridgeshire, Northamptonshire, Lincolnshire, Yorkshire, were subdivided into two or more administrative counties, and London County was created. The population of the different administrative counties vary from London County with 5,000,000 inhabitants to Rutland with less than 25,000. The same administrative type of organization practically governs each. Since their institution considerable improvement has been effected in local government throughout England and Wales. See GREAT BRITAIN—GOVERNMENT; LONDON.

COUNTY DEMOCRACY, New York, founded 1880 and lasting till 1890, represented a "better citizenship" movement started in New York city and county, with the object of reforming Democratic organization and curbing the power of Tammany Hall. In 1881 their delegates defeated the Tammany representatives at the State convention; in 1884 they elected Mayor Grace; in 1886 Tammany united with County Democracy to defeat Henry George and elect Mr. Hewitt mayor, withdrawing its support when he asserted independence of its control. In 1888 Mr. Hewitt was defeated for re-election, and in 1890 County Democracy, uniting with other reform associations, ceased as an independent organization. See NEW YORK CITY.

COUNTY GOVERNMENT IN THE UNITED STATES. Local administration in the United States is not regulated by any legislation of the national government, but is determined by each of the 48 States acting independently. Under these conditions there are inevitably countless variations in the organization and powers of the local authorities in the different States; and an account of the system of local administration requires an elaborate study of the constitutions and laws of all the States. At the same time such an examination discloses certain important institutions resembling each other throughout the Union; and other features which are similar in closely related groups of States. These conditions are due to the historical origin of American institutions in those of England, to the constant intercourse between the various States, and to the conscious and unconscious imitation and adaption by each State of the institutions and practices of other States.

Among the districts of local administration in the United States, the most common is the county. Every State is divided into districts called counties, except in the State of Louisiana, where the corresponding district is known as the parish; and with a great deal of variation in the powers and organization of the county authorities, there are yet important features in common which mark county administration as fundamentally similar throughout the United States.

The American county occupies a distinctly different position in the general plan of public administration from the chief local districts in European countries. The name county indicates its historical connection with the county in England, from which the American county has developed. But in its functions and general importance the American county now differs widely from the English county; while it is even less like the provinces, departments, circles or other local districts in the countries of continental Europe.

Historical.— To understand the development of the county in the United States, it is necessary to note the system of county administration in England in the 17th century, when the English colonies in America were established. At that time the important county officials in England were the lord lieutenant, the sheriff, the coroner and justices of the peace. All but the coroner were appointed by the Crown; but after the decline of the active control by the Privy Council, the local administration in practice was highly decentralized. The lord lieutenant was head of the militia system. The sheriff was the chief conservator of the peace and executive agent of the judicial courts. But local administration was mainly looked after by the justices of the peace, the justices in each county forming collectively a quarterly court of criminal jurisdiction, which also acted as the fiscal and administrative authority for county affairs.

In the American colonies counties were organized with similar officials, appointed by the colonial governors. But during the colonial period, and especially about the end of the 17th century, important changes were made in some of the colonies. In New York and Pennsylvania locally elected county boards were established, which gradually acquired the fiscal and administrative powers of the justices of the peace. In Pennsylvania the sheriffs were made locally elective in 1705. Some new county officers and additional county functions also developed; the county treasurer appearing first in Massachusetts; local prosecuting attorneys in Connecticut; and in most of the colonies county recorders were provided to keep public records of documents relating to land titles.

At the same time the importance of the county was affected by the development of town government in New England and to some extent in the middle colonies from New York to Pennsylvania. But in the southern colonies the county was the main unit of local administration.

From the establishment of State governments in 1776 until the middle of the 19th century important changes in county administration, as well as in other features of State and local administration, were gradually introduced, both in the seaboard States and in the new States organized in the interior. The main results of these changes were to establish a radically democratic and decentralized system. The electoral franchise was extended to include all male citizens. County officials were made locally elective; and the number of such officials was largely increased. In most of the States an elective county board took over the administrative functions of the justices of the peace; while the sheriffs, prosecuting attorneys, county treasurers, county clerks, county recorders and the justices of the peace all became elective officials.

Since the Civil War there have been few general and permanent changes in the legal principles of county administration. But with the growth of the United States there have been important developments in the functions of the county and in the methods of administration. The county system has been extended throughout the country; and the increase of population and the general tendency toward the expantion of public activities have added much to the scope of county administration.

General Characteristics.— A county is one of the civil divisions of a State for judicial and political purposes; and at the same time is a district of a quasi-corporate character for purposes of local administration. Generally the State legislature has power to establish counties; and in the North Atlantic group of States this power is not limited. But the constitutions of most of the States now impose various restrictions,— as to minimum area and population and requiring the consent of the voters. In most of the States the organization of new counties and changes in county boundaries are now seldom made; but in some of the newer States the creation of new counties and readjustment of boundaries are still not infrequent.

There are about 3,000 counties in the United States. Most of the larger States have from 60 to 100 counties each. At one extreme Texas has 245 counties; at the other Rhode Island has five and Delaware three.

In area and population the counties show great differences; but for the most part American counties are much smaller both in area and population than counties in England, departments in France, and provinces in Prussia, Belgium, Italy or Spain. Nearly two-thirds of the counties contain from 300 to 900 square miles; and the most usual areas are from 400 to 650 square miles. More than half the counties have a population of 10,000 to 30,000; but in the North Atlantic States more than half the counties have over 50,000 population, while in the Southern States and still more in the States west of the arid plains many counties have less than 10,000 population.

Nine-tenths of the counties are mainly rural in character; but most counties contain urban communities, a considerable number have important cities, and the most important counties are those where the largest cities are located,—as New York city (which includes five counties), Chicago, Philadelphia, Saint Louis, Boston, Baltimore, San Francisco and Denver. In most of these cases the county administration is partly absorbed in that of the city.

The comparatively small area and population of most counties in the United States necessarily makes them less important for some branches of public administration than the counties, departments and provinces in European countries. On the other hand the highly decentralized methods of administration followed in the States of the American Union adds greatly to the number of officials locally elected by counties. Not only local county authorities, but even the principal local agents of the central government are elected within each county, and are subject to little or no effective supervision by the central government of the States. The national government has no supervision or control whatever over county or other locally elected officials.

Powers and Functions.—There are wide variations between the States in the relative importance of the county as an administrative district; and the powers and public functions of counties and county officials are far from uniform in all the States. But it is possible to note certain common factors and to call attention to some of the most important differences.

Very little in the way of legislative power, even in local matters, has been conferred in counties on the United States. They are considered in judicial decisions as primarily agents and instrumentalities of the State to carry out its governmental functions. The county officials thus act almost entirely under the provisions of statutes passed by the State legislatures, which define their duties and enumerate their powers in minute detail. Important questions are, however, often submitted to a popular referendum of the whole body of electors in the county,—such as the location of the county seat, loans for public buildings or public works, and the prohibition or licensing of places for the sale of intoxicating liquors, under "local option" laws. In 1909 a more general grant of local legislative power was made to the county authorities by the legislature of the State of Michigan. In 1911 California adopted a home rule constitutional amendment authorizing counties to frame and adopt their own charters of local governments.

But if the legislative power of the counties is small, its administrative functions are numerous; and locally elected county officials are entrusted with the execution of the most important State laws.

In all the States the county is primarily a district for the administration of justice. Courts of general criminal and civil jurisdiction are held at intervals in every county. The judges of these courts are usually elected (or in some States appointed) for a larger district than a single county; but a number of the more populous counties form each a judicial district for such courts; while more frequently county judges with a limited jurisdiction are locally elected. In any case the administrative officers of such courts (clerks, sheriffs and prosecuting attorneys) are, for the most part, elected within each county. In connection with the administration of Justice, courthouses and jails are maintained in each county. The county is also to a slight extent a police district, the sheriff acting as conservator of the peace; but no system of organized and disciplined county police has been developed in any of the States. In nearly every State the county is the district for the public record of land documents, and for the probate of wills, the administration of estates and supervision of orphans.

Except in some of the New England States, counties have to do with the construction and maintenance of the more important roads and bridges, and sometimes have charge of other local public works. But even the construction of main highways has until recently been done for the most part in a primitive way; and in the States where high class roads have been built, the work has generally been done by State authority.

In all the States outside of New England (and in New Hampshire) the county is a district for the administration of poor relief. Public almshouses or poorhouses are maintained; and in the more populous counties there are other charitable institutions. But such specialized institutions as hospitals for the insane, and schools for the deaf and dumb, are for the most part maintained directly by the State governments.

Outside of New England the county is a district for school purposes. In the most important group of States, covering the central region from New York and New Jersey west to Kansas and Nebraska, county school officers supervise the local school officials in the rural districts. In many of the Southern and Western States the county is the main unit for local school administration.

In many States the county is also a district for the administration of health and sanitation laws.

In connection with these functions and also as agents for both State and smaller districts, the county in all but the New England States is a district of considerable importance in finance administration. It levies taxes and expends the proceeds for the different purposes noted above. In most States county officials act also as agents for the collection of State revenues; and frequently also for the collection of revenues of smaller local districts. In the States of the South and the far West, property is assessed for taxation by county officials; and in many other States county officers have some supervision over local assessments.

The numerous list of officials elected in each county makes the county an important election district; and it is also a unit for the canvass of votes for officials elected in larger districts, such as members of Congress and State officers. The position of the county as an election district is indicated by the importance of the county committee in the political party organizations in many of the States.

Measured by the number of functions and by the relative importance of the county in comparison with smaller local districts, the county is of most importance in the Southern States and the Mountain and Pacific Coast States. By these tests the county is relatively of least importance in the New England States, where on one hand the judicial administration is more highly centralized, while on the other hand the towns are local districts of importance.

But if a quantitive standard of the intensity of county administration is applied, the relative positions are somewhat different. Judged by the per capita rate of expenditure, the county is of much the greatest importance in the States from the Rocky Mountains westward. Second rank is taken by the populous Middle Atlantic and North Central States, where indeed the largest aggregate county expenditures are made. By this standard of per capita expenditure the Southern States fall in the third rank. Of the New England States — in Massachusetts, New Hampshire and Maine, county finances are of some importance, but in the others they are negligible.

Until recently county finances were comparatively unimportant, but have notably increased since 1900. County taxation hardly doubled in the 30 years from 1870 to 1902, but in the next decade to 1913, had again doubled; and during this period county revenues and expenditures gained at about the same rate as those of the central State governments.

Nearly half of the total county receipts and expenditures are trust and agency funds, mostly taxes collected for the State and for other local authorities. County revenues and expenditures are about the same as those of the State governments; but both State and county finances are on a much smaller scale than those of the National government or cities.

The main source of county revenue is from the general property tax. There are numerous fees, which yield a considerable sum, as do also State subventions for schools and roads; and loans for roads and public buildings are becoming more important.

Next to general expenses, county payments for schools are the most important,— made up largely in the Southern and far Western States; in other States school expenses are mainly borne by other local districts. Next in importance are expenses for highways and for public charities, — the latter being the largest item in the Middle Atlantic and sôme of the North Central States. In the New England States, the expenses of judicial administration are relatively of most importance.

County Organization.— No well-defined principle seems to have been followed in the organization of county administration, except that popular election has been extended to all classes of county officials indiscriminately. There is no authority with important powers of local legislation corresponding to the councils general of France, the county councils of England or the local diets in Prussia. In all but two States (Rhode Island and Georgia) there is a county board which usually levies local taxes and has general supervision over the local administration, though by no means an effective control over the elective officials. In two-thirds of the States these county boards are composed of three to five members, usually called commissioners and elected at large. In some States, however, the county boards are larger and include from 15 to 50 members elected by the townships and cities. Such boards of supervisors are found in New York, New Jersey, Michigan, Wisconsin and Illinois; and there are somewhat similar bodies in Louisiana under the title of police juries. In some States there are intermediate types. In a few of the Southern States (Kentucky, Tennessee, Arkansas) the fiscal and administrative business of the county is still performed by the local justices of the peace sitting as a County Court, these justices being now elected in subdivisions of the county. But these larger bodies have, as a rule, but little more legislative power than the small boards of commissioners; and their size make them unwieldy for administrative business. An important exception is found in the recent legislation of Michigan, where the boards of supervisors have been given a broad and general grant of local legislative powers.

In a few States the powers of taxation and appropriations are placed in a body distinct from the county board, as in Indiana, where there has been established (in 1899) in each county a county council of seven members in addition to the board of three county commissioners; while somewhat similar results have been secured in other ways in some of the smaller New England States. In Cook County, Illinois, and some New Jersey counties the president or chairman of the county board has some special powers. In Georgia the ordinary is the chief county officer. But this separation of powers is as yet exceptional.

Besides the county board there are a considerable number of other county officials, most of them chosen by popular election. These elective officers are largely independent within their own sphere; and there is no effective supervision either by the county board or by any one of the officials being clearly recognized as the chief executive officer of the county.

The sheriff is the oldest of the county officers; but he has lost much of the power and dignity of the English sheriff. He still retains some relics of former authority as chief conservator of the peace; but for the most part is now a ministerial officer of the judicial courts, to execute their warrants and decrees. The public prosecutor has now become one of the principal county officials in some of the States; and in counties containing large cities, such as New York, Chicago, Philadelphia and Saint Louis, the importance of this office is more fully realized. In several cases it has been a stepping stone to the governorship of a State. The office of county treasurer is usually one of the most lucrative; and is important as the financial agent not only of county funds, but also as the collector of State revenues and sometimes also the revenues of local districts within the county.

Other elective county officials of less importance are the county clerks, court clerks, recorders of deeds, auditors, assessors, school commissioners, surveyors and coroners. The titles of some of these officials vary in the different States. In the New England States there are comparatively few county officers; and in Rhode

Island there are only two — the sheriff and clerk of court — both of whom are chosen by the general assembly. On the other hand, there are in some States additional elective officials, besides those named above; and in most of the States there are also a number of appointed officials, such as poor commissioners, road superintendents and health officers.

County officers in the United States are usually elected for terms varying from two to six years. In the older States east of the Mississippi River, the terms of different officers often vary and overlap. West of the Mississippi most of the States have a uniform term of two years for county officers, and all terms expire at the same time.

In most counties the subordinate staff is small, and subject to change with the frequent changes of the elective officers. In the more populous counties, the number of deputies, clerks and other employees is larger and of more importance; but in most cases they remain under the patronage and spoils system. The merit system of civil service has been applied to some extent only in a number of the larger New York and New Jersey counties and a few isolated counties in other States.

There is some State administrative supervision over county school officers; and more recently in about half the States over the assessment and collection of State revenues by county officials, and in a number of States over county road officers in the construction of State-aid roads. But there is no effective State control over sheriffs and prosecuting attorneys; and no general system of State supervision.

There can be no doubt that county government in the United States lacks systematic organization, and that there are too many elective offices. The numerous list of positions and the slight importance of many of them makes impossible any real knowledge or discussion on the part of the voters of the merits and demerits of candidates. Elections, especially in the more populous counties, are usually determined by the success of one party ticket, and the effective choice is thus made in selecting the party candidates. This has tended to strengthen the influence of party machines and bosses; and in many cases county offices have been filled by politicians of the lower types. In rural counties a popular candidate may more often secure his election on personal grounds; and there have been some important cases of successful independent candidates in populous counties. But as a rule, comparatively little public attention is paid to the election of county officials. The short terms promote frequent changes and prevent efficient management in the offices, many of which are purely administrative and with no political functions. At the same time the duties of the county officials are of no little importance; and as their importance is steadily increasing, there is little serious need for decided changes in the organization of the county administration.

During the last few years there has been increased attention to the county government, especially in States containing large cities; and proposals for important changes in organization have been urged, notably in New York, New Jersey, Illinois and California. In the latter State several counties have adopted home rule charters making important changes. Under the Los Angeles County charter, the only elective officers are the supervisors, sheriff, district attorney and justices of the peace. Other county officers are appointed by the supervisors and constables are appointed by the sheriff, all from civil service lists.

To Summarize.— The county in the United States has developed from the English county, but the organization of the county administration has been thoroughly decentralized and in fact disorganized by the radical extension of popular elections for all classes of officials. Most of the 3,000 counties are smaller in size and social importance than the principal districts of local administration in European countries; and the field for administrative action is necessarily less important in some respects. But the decentralized system of State administration adds to the number of locally elected and appointed officials in the counties. The administration of justice, roads and bridges and poor relief are the principal branches of county administration; while there is some county supervision of public instruction in most States, and the county is the main local unit for school purposes in some of the Southern and far Western States.

The principal county authority is the locally elected county board, organized in various ways, with administrative and taxing powers, but with little local legislative authority. Among the numerous other elective officials are the sheriff, prosecuting attorney and treasurer; but there is no clearly defined chief executive, and the county administration should be more systematically organized to meet the increasing importance of the functions exercised. There should also be more effective State supervision over the county officials who act primarily as agents for the enforcement of general State laws. Many counties are too small in area; and in the larger States there is need for local districts larger than the county.

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COUNTY-SEAT, the village, town or city in every county selected as headquarters for the county administration and containing the courthouse, including offices for the prominent officials and the jail. The most prominent building is frequently selected as the county courthouse in scattered farming communities. The legislatures usually select the county-seats and can change them, but west of the Alleghanies, in about half of the States, a local popular vote under constitutional provisions is required for the purpose. As county-seat the location assumes importance, being the principal — although not necessarily the largest — community in the county, concentrating there the public business; and in newly settled regions or territories there is frequently great rivalry to secure this selection, while efforts are sometimes made to have a chosen location changed.

COUNTY TRAINING SCHOOLS. See Teachers, Professional Training of.

COUP, koo (Fr. "a stroke"), a word used in certain phrases which have become almost universally current. *Coup d'état* (stroke of state) means an arbitrary encroachment suddenly effected by the governing authorities upon the constitution of a state, altering or setting aside the prerogatives of other parts of the body politic. The term is applied particularly to the procedure whereby Louis Napoleon placed himself as virtual dictator at the head of government in France, 2 Dec. 1851. *Coup de main* (a stroke of the hand) means a sudden and successful attack; *coup d'œil* (a stroke of the eye), a quick comprehensive view of a complicated matter; *coup de theâtre,* a trick of the stage, or any striking dramatic effect; and *coup de grâce,* the merciful blow that puts a victim out of pain; hence a decisive or finishing stroke. In Canada the word is used to designate a war custom of the Plains Indians. The first warrior to touch an enemy or his body was credited with a coup or deed of honor. On the number of coups, the social rank of the individual depended. Consult Grinnell, "The Coup" (in *American Anthropologist,* 1911).

COUPÉ, koo-pā, a four-wheeled carriage carrying two persons inside, with a seat for the driver outside. The same name is applied to a compartment of a railway carriage in continental Europe.

COUPER, koo'pėr, **William,** American sculptor: b. Norfolk, Va., 20 Sept. 1853. He studied at the Cooper Institute, New York, and the Royal Academy at Munich. In 1875 he removed to Florence and entered the studio of Thomas Ball. In 1897 he returned to America and established himself in New York. His art is modern Italian in manner, but its beauty and technique are somewhat marred by overelaborate detail and neglect of powerful lines and planes. His management of drapery is especially good. Among his works are 'Mother's Love'; 'The Falconer'; 'Beauty's Wreath for Valor's Brow'; the marble statue of Moses on the Appellate Courthouse, New York; 'Te Deum Laudamus,' and several peculiarly sympathetic and exquisitely executed angels for funeral monuments. His portraits include the heroic bronze bust of Prof. Thomas Eggleston, Columbia University, New York, and that of President McKinley. He won the competition for the monument to Colonel Hawkins, at Pittsburgh, Pa. Consult Taft, 'History of American Sculpture' (New York 1903).

COUPLAND, William Chatterton, English philosophical writer: b. London, 2 Dec. 1838; d. 7 Jan. 1915. He was educated at Manchester New College and the University of Berlin, and held Unitarian pastorates at Bridgewater 1864–68, and at Kensington 1870–72. He was professor of mental and moral science at Bedford College for Women, London, 1881–86; first secretary of the English Goethe Society 1886–90; and has since lectured on philosophical themes. He has published 'Incentives to the Higher Life' (1866); translation of Hartmann's 'Philosophy of the Unconscious' (1884); 'The Spirit of Goethe's Faust' (1885); 'Elements of Moral Science Applied to Teaching' (1889); 'Gain of Life and Other Essays' (1890); 'Thoughts and Aspirations of the Ages' (edited, 1895).

COUPON, koo'pŏn (from Fr. *couper,* to cut), a warrant or certificate for the periodical payment of interest on bonds issued for any term of years. The interest being payable in different cases quarterly, half-yearly or yearly, as many coupons are attached to each bond as represent the total number of such payments as are to be made, with the date of payment printed on each. When a payment of interest becomes due at any particular date the holder of the bond detaches the corresponding coupon and presents it for payment at the specified banking house or office. The term is also applied to one of a series of tickets which bind the issuer to make certain payments, perform some service, or give value for certain amounts at different periods, in consideration of money received. Each interest or dividend coupon constitutes in law a separate claim or demand and may be separately enforced. The advantage of the coupon lies in the fact that corporate coupons are of a negotiable or quasi-negotiable character facilitating their transfer. See Negotiable Instruments.

COUPON BALLOT. See Ballot.

COURBET, koor'bā', French painter: b. Ornans, Franche-Comte, 10 June 1819; d. near Vevey, Switzerland, 31 Dec. 1877. In 1839 he was sent to study law in Paris, but all the bent of his nature was turned toward art. He studied at the studio of Steuben and Hesse, but he preferred to work independently. He made himself acquainted with the Flemish, Florentine and Venetian schools; but amid all he was careful to preserve — as he phrases it — his "own intelligent and independent individuality." His first works were literary subjects, but he soon became interested in portraying live subjects. At this time he painted 'The Man with a Pipe,' and his own portrait with a dog. These subjects, treated broadly, were not accepted by the Salon; but were welcomed enthusiastically by the Realists. Courbet became the chief leader of this sect. He despised his critics, and even went so far as to exhibit independently. In 1841 he took to landscape work, painting in the forests of Fontainebleau. In 1844 he began to exhibit at the Salon; and his works created a great sensation when shown in the Salon of 1850. Among the pictures of this period are 'After Dinner at Ornans,' 'The Stone-Breakers,' 'Peasants of Flazey.' His hunting scenes and animal subjects and marines are especially vigorous and spirited. But he is often coarse and lacks spirituality throughout. After the revolution of 1870 he was appointed director of the fine arts. His radicalism in painting led him to attempt to promote political and social reform, to which end he wrote essays and dissertations. When Napoleon offered him the cross of the Legion of Honor, he openly refused it, and this heightened his populartiy among the people. In the following year he joined the Commune, and was responsible for the destruction of the Vendôme Column (16 May). For this act, in the following September, he was sentenced to six months' imprisonment and a fine was imposed for its restoration, his pictures being sold in 1877 toward that purpose. On his release he retired to Vevey. Several of his pictures are owned in the United States, four of them being contained in the Boston Art Museum. The various provincial museums of France possess many of his paintings, as do likewise the collections of Frankfort, Cologne, Vienna, Amsterdam, The Hague, Copenhagen and Munich. Consult for biography and criticism, Estignard (Paris 1874); D'Ideville (ib. 1878); Van Dyke, ‘Modern French Masters’; Manz, ‘G. Courbet’ (in *Gazette des Beaux-Arts,* Paris 1878); Muther, ‘History of Modern Painting’ (Vol. II, London 1896, 1907); Zola, ‘Mes Haines’ (Paris 1879).

COURBEVOIE, koor-be-vwä', France, town in the department of the Seine, on the left bank of the Seine, in the northwest suburbs of Paris. In 1883 a bronze group, the ‘Monument de la défense de Paris,’ by E. Barrias, was erected here. It contains numerous handsome villas; extensive barracks built by Louis XV for the Swiss regiment, and manufactures of white-lead, carriages, brandy and drugs. Pop. 23,765.

COURCELLE, koor-sĕl, **Daniel de Rémy,** rā-mĭ, governor of Canada, 1665–72. The Mohawk Indians annoyed the colony by constant attacks, for which the governor sought to punish them by leading an expedition against their encampments. In the winter of 1666 he marched with 300 or 400 men from Quebec to the Mohawk Valley by way of Lakes Champlain and George, but gained nothing as the extreme severity of the season decimated his force. The next year with a much larger force, and under more favorable conditions, he had greater success and succeeded in destroying several strongholds of the Indians. This invasion of English territory caused much alarm in the New York colony, and Governor Nicolls protested vehemently. Consult Parkman, ‘Old Régime in Canada.’

COUREURS DE BOIS, koo'rėr' dẹ bwä, or rangers of the woods. During the French régime, numbers of the adventurous youth of Canada, and even soldiers of the regular garrison, subjected to the vexatious restrictions of a paternal government, took to the woods and lived the free life of the Indians, trading with and frequently marrying among them. This drain on the resources of the colony called for the strongest inhibitions from the representatives of Church and State, and amnesties were offered to *couriers de bois* to return and engage in agriculture, but few availed themselves of these offers. They were, however, always loyal to the French interest, and their alliances with the Indians gave them great ascendency over the savages and kept them friendly to the French power.

COURIER, koo'rĭ-ėr, a bearer of special dispatches, whether public or private. The employment of couriers is of great antiquity. There was a very complete organization of them in the ancient empire of Persia. They were also used by the Greeks and Romans. In the Middle Ages each sovereign employed a staff of couriers, while the nobility in France and England also engaged professional runners called "laquais" in France and "running footmen" in England. In Germany and Spain toward the middle of the 15th century the couriers were given permission to carry unofficial letters. Couriers who act as guides to and attendants on travelers are common on the continent of Europe, and are useful to those having much baggage or unacquainted with the foreign languages and moneys. Their special duty is to make all arrangements for journeys, and to relieve their employers as far as possible of anxiety about passports, exchange of money, hotel negotiations and the like. The ability to speak several languages is therefore one of the many important qualifications of a good courier.

COURIER DE MÉRÉ, koo-rē-ā dė mā-rā, **Paul Louis,** French Hellenist: b. Paris, 4 Jan. 1772; d. near Veretz, Touraine, 10 April 1825. He was a pupil in the artillery school at Châlons and served in the army 1792–1809. In 1813 he made an elegant translation of ‘Daphnis and Chloe,’ an ancient romance by Longos, discovered by him at Florence; he also translated ‘The Luciad, or the Ass of Lucius of Patras,’ published with the Greek text (1818). His numerous pamphlets, especially his ‘Le pamphlets des pamphlets’ (1824), are masterpieces of style, of marvelous conciseness and noteworthy documents for the history of the ancient political and ecclesiastical contentions. He was assassinated shortly after the publication of this paper. His ‘Œuvres complètes’ were published in four volumes, with an essay on his life by Armand Carrel (Paris 1830; new ed., 1890). Consult Gaschet, ‘La jeunesse de Paul-Louis Courier, étude sur sa vie et ses œuvres de 1772 à 1812.’ The same author has also published a critique of his style. Consult also Schwab, ‘Vie politique de P.-L. Courier’ (*Mercure de France* 1909); Sainte-Beuve, ‘Causeries du Lundi’ (Vol. VI, 1857–72).

COURLAND, Duke of. See BIREN, ERNEST JOHN.

COURLAND, or **KURLAND,** Russia, a province on the Baltic, bounded north by Livonia and the Gulf of Riga, west by the Baltic, south by Kovno and east by Vitebsk; area, 10,535 square miles. In the neighborhood of Mitau, the capital, the surface is diversified by hills of very moderate height; but elsewhere, and particularly toward the coast, it is flat and contains extensive sandy tracts. About two-fifths of the whole province is occupied by forests; and there are many small lakes. The principal rivers are the Aa and the Windau; the latter is connected with the Niemen by a canal. Agriculture and cattle-raising form the chief occupations of the inhabitants, but many are engaged in fishing. The industrial establishments include distilleries, breweries and factories for tobacco, metals, wool and leather. Letts form the largest constituent element in the population, there being also Germans, Jews, Russians and Poles. The climate is moist, and the winters very cold. The prevailing religion is Lutheran. Courland was anciently a part of Livonia, and, like the latter, was conquered in the 13th century by the knights of the Teutonic order. It was subsequently united with Semgall, and, under the name of the Duchy of Courland, the two provinces became a fief of Poland. The duchy, however, was governed by its hereditary dukes till 1737. The 6th duke, Frederick William, espoused in 1710 Anna Ivanowana, Princess of Russia, who, after his death, maintained possession of the duchy; but the government of it was entrusted to Prince Ferdinand, brother of the deceased duke. On the death of Ferdinand in 1737 the Estates, in consequence of the influence of the Empress of Russia, elected to succeed him her favorite and grand chamberlain, Ernest John Biren, who was exiled to Siberia in 1740. In 1762 the Emperor Peter of Russia recalled Biren, who, after some contention with Prince Charles, son of the king of Poland, who had been placed over the duchy in his absence, was declared by the Estates the only legitimate duke. In 1769 he transferred the duchy to his son, at whose death the Estates of Courland solicited a union with the Russian Empire. Catharine consented, and, by an edict of April 1795, secured to the inhabitants all the privileges which they had enjoyed under their princes and all the rights of her other subjects. In 1818 the Emperor Alexander confirmed the charter of the nobility of Courland, which declared the peasants free, and regulated their relations to their former lords. Libau is the chief commercial city. During the Great European War, a large part of the province was in German occupation, and was the base of attacks against Riga. Pop. 749,100.

COURNOT, koor-nō', **Antoine Augustin**, French economist and mathematician: b. Gray 1801; d. Paris 1877. He was appointed professor at the Faculté de Lyon in 1834; was made director of the normal school at Grenoble in 1835, and of that of Dijon in 1854. He did important work in philosophy in relation to the adjustment of rational processes to inanimate nature and the resultant insufficiency of the former as a means for the analysis of vital phenomena. Cournot's fame, however, is founded principally on his mathematical researches relative to the theory of probabilities, which he sought to apply both to natural philosophy and to political economy. He simplified the theory of the equilibrium of supply and demand and discovered the theory of monopoly price now generally held by economists, and elucidated many other economic theories in regard to public finance. His greatest service, perhaps, was his application to the problems of statistics of the mathematical theory of probabilities. He is the author of 'Traité de l'enchainement des idées fondamentales dans les sciences et dans l'histoire' (1861); 'Principe de la théorie de la richesse' (1863); 'Des institutions d'instruction publique' (1864); 'Considérations sur la marche des idées et des événements dans les temps modernes' (1872); 'Matérialisme, vitalisme, rationalisme,' etc. (1875); 'Revue sommaire des doctrines économiques' (1877).

COURSER, a bird of the genus *Cursorius*, belonging to the family *Glareolidæ* of the order *Charadriiformes* (waders), closely allied to the plovers, characterized by a decurved bill as long as the head, arched mandibles compressed toward the extremities, basal oval nostrils with an oblong lateral opening and long whitish legs with three separated front toes, the middle one longest and armed with a serrated claw. They are found chiefly in Africa and Asia, on arid inland tracts, along which they run with great swiftness. One of the species, called the black-bellied courser (*C. temminckii*), is eight inches long, and generally of a cream-colored brown, varied by a ferruginous head and breast, and black on the quills and middle of the body. One of the best-known species is the cream-colored courser, or swift-foot (*C. gallicus*), found almost exclusively in the East, although it has been seen as an occasional visitor in western Europe.

COURSING, a kind of sport in which hares are hunted by greyhounds, which follow the game by sight instead of by scent. Coursing is a very old sport, but in modern times it has been considerably modified in various ways, mainly through the influence of the English coursing clubs, which began to be formed in the latter half of the 18th century, one prominent club, the Swaffham, being founded in 1776. These clubs in 1858 formed a central body called the National Coursing Club, which now controls the whole sport. In 1882 the 'Greyhound Stud Book,' a genealogical record, was started, and dogs without pedigrees, or not entered in that book, are not now allowed to compete. Meetings are held in various localities, at which dogs are entered for a variety of stakes, as horses are at a race-meeting. The «blue ribbon» of the coursing year in England is the Waterloo Cup, run in the Altcar meadows, near Liverpool, for which 64 dogs compete.

This pastime has become immensely popular in the western United States, and under the supervision and control of the American Coursing Board large meets annually take place in the open country of the two Dakotas, Kansas, Nebraska, Iowa and Minnesota, where hares are plentiful. The contests take place in practically the same way as in England and under similar rules. The greyhounds are sent out, two in each leash, in the care of a «slipper,» who lets the dogs slip upon orders from the judge, when a hare has been sighted. The judge follows the dogs, and gives «points» to each according to the cleverness of its individual work. It may so happen that the dog which actually kills the hare may not be adjudged victor, because the other dog may have made the most points during the course. The following is the scale of marks: (1) For speed, according to the degree of superiority shown, one, two or three points. (2) For the «go by» (the starting of a greyhound a clear length behind its opponent, passing him in a straightaway run and obtaining a clear length's lead), two or three points. (3) The «turn» (a sharp turn of not less than a right angle in the hare's course when pressed by a dog), one point. (4) «The wrench,» a change of less than a right angle in a hare's course when pressed, half a point. (5) «The kill,» two points or less. (6) «The trip,» an unsuccessful effort which throws the hare off its legs; or the getting so close to the hare as to snatch the hare and lose hold, one point, more or less, in the judge's discretion. One course will often traverse three miles before a kill is made. The cavalcade of sightseers is kept in a line behind the coursing hare and hounds by the steward. Consult Macpherson, H. A., 'Coursing the Hare' ('Fur and Feather Series'); Earl of Suffolk, 'The Encyclopedia of Sports and Games' (London 1911).

COURT, koor, **Antoine**, French Protestant clergyman: b. Villeneuve-de-Berg, Ardèche, France, 17 May 1696; d. Lausanne, Switzerland, 15 June 1760. He was one of the most prominent Protestant leaders of his time and is commonly regarded as the restorer of the Reformed Church in France and the founder of the «Church of the Desert.» At the age of 17 he began to address secret assemblies of persecuted Calvinists. Impressed by the fact that the only way to maintain the religion was by organization rather than by the inspiration of zealots, he devoted his life to the building up of regular churches in the various small communities. To this end he summoned a synod of all the preachers in the Cevennes and lower Languedoc at Monoblet. A regular church system and rules were agreed upon. Pierre Cortley received ordination at Zürich, and by him Court was likewise ordained. Persecutions broke out again in 1724, and Court fled to Lausanne (1730). There he labored incessantly for the founding of a college, of which he was the director and chief pillar for the rest of his life. From this college emanated the pastors of the Reformed Church of France. Court collected documents for a study of Protestantism in France, but his work was not completed and the materials are still preserved at Geneva. His best work is the 'Histoire des troubles des Cevennes ou de la guerre des Camisards' (1760). His son was Antoine Court de Gebelin (q.v.). Consult Hugues, 'Antoine Court' (1872); Baird, 'The Huguenots and the Revocation of the Edict of Nantes' (1895); Peyrat, Napoléon, 'Histoire des pasteurs du désert' (1842; Eng. trans., 1852); Haag, E. and E., 'La France protestante' (Vol. IV, new ed., 1884).

COURT. Although the word «court» is still used as descriptive of the household of a reigning monarch and in connection with the official functions of royalty, it is now almost exclusively used in the United States and European countries in connection with judicial tribunals. The objects and powers of these judicial tribunals called courts in English-speaking countries, and probably in all lands where such institutions are free and independent of the executive, are: (1) The preservation of personal liberty, the enforcement of the criminal and penal laws, and the punishment of all infractions thereof, and the conservation of the public peace, order and safety; (2) the preservation of property rights, the adjudication of disputes and controversies between individuals, corporations and states, and the determination of all kinds of legal actions commonly known as civil suits.

The establishment of law courts, the growth and gradual increase of their jurisdiction and power has marked, step by step, the advance of civilization, the increase of personal liberty, the rights of individuals to enjoy and to hold property, and to maintain suits for the preservation and enforcement of their civil liberties and the free and unrestrained enjoyment of their personal and real property. Almost every gain in these directions made by the courts of Great Britain in the increase of their authority and jurisdiction represented the acquirement by individuals of increased liberty and the enjoyment of their property rights, coupled with the curtailing of the prerogatives of the king, springing from the acquisition by the people of some great charter enlarging their liberties.

English Courts.— In very early days in England and in many of the European countries, all of the power and jurisdiction now held by the law courts was vested in and exercised by the king or the executive ruler, commonly described as the throne. This was also true in the primitive administration of law among the ancients. Such judicial powers were exercised by the executive in early Rome and were delegated to many of the subordinate officers. In the states of Greece the king or chief magistrate was not alone a military leader, but was also the chief judicial officer, as is the case now in Oriental autocracies where the sovereign appoints deputies to act as judges subject to his right of review on appeal. This is the system in vogue at the present time in Persia and Turkey, where the deputies of the shah and the sultan respectively govern the various states and administer the laws. The early English kings held almost absolute judicial power; they were to all intents and purposes courts of law. The sole executive and judicial authority over whatever law there was, free from the will of the king, vested in his person and was exercised by him to such an extent that individual ownership and personal liberties were subordinated to his absolute whim and caprice. As a legal fiction the king was considered, even after the courts had assumed a large measure of independence, the head of the court, and in such sense the king is so treated purely as a matter of fiction at the present time in England, for in that country and throughout Great Britain all writs run in the name of the king. That the administration of justice was one of the prerogatives of the English king in early times is clearly shown by the fact that the king himself sat on circuit even as late as the rule of Edward IV. Regular courts had then been established but authority was still vested in the king to participate personally in the business of the courts. King James I exercised what has been frequently termed the last judicial act of an English monarch when he settled the controversies between the courts of law and the Court of Chancery.

The first step toward the separation of the executive and judicial powers as jointly vested in the king came when King John was compelled to sign the Magna Charta, or Great Charter, in 1215. By the Great Charter the inconvenience caused by the court following the king's person was remedied, as far as private litigation was concerned, by the provision that *communia placita* — common pleas — should be held at some fixed place, and it was in this way that the Court of Common Pleas was established in England and that the independence of the courts became a vested right of the people.

John Richard Green, in his 'History of the English People,' after commenting on the vagueness of some of the provisions of the Great Charter says: «But all vagueness ceases when the Charter passes on to deal with the rights of Englishmen at large, their right to justice, to security of person and property, and to good government.» He also writes: «A memorable article that lies at the base of our whole judicial system ran, 'No freeman shall be seized, or imprisoned or dispossessed, or outlawed, or in any way brought to ruin; we will not go against any man or send against him, save by legal judgment of his peers, or by the law of the land.' »

Another section of the Great Charter reads as follows: «To no man will we sell or deny, or delay, right or justice.»

In summing up the beneficial effects of the

Great Charter, Mr. Green writes: "The great reforms of the past are now formally recognized; judges of assize were to hold their circuits four times in the year, and the king's court was no longer to follow the king on his wanderings over the realm, but to sit in a fixed place."

During the reign of Edward I judicial reforms of great importance were brought about. The King's Court was divided into three distinct tribunals: (1) The Court of Exchequer, which took cognizance of all cases in which the royal revenues were concerned. (2) The Court of Common Pleas, for the trial of suits between private persons. (3) The Court of King's Bench, which had jurisdiction in all matters that affected the sovereign as well as in pleas to the Crown, or criminal cases that were expressly reserved for his decision. Each of these courts was provided with a distinct staff of judges.

Another judicial reform of even greater importance was the establishment, in the reign of Edward I, of an equitable jurisdiction, side by side with that of the common law. By this measure was brought into existence the equity side of the court, and by it the courts were enabled to give more adequate relief in many cases of injustice. The king, in whom, as above stated, the judicial power vested, delegated his judicial authority to the several courts of law by means of a "writ." No case could be instituted in a court of law except by the purchase of the proper writ. The common-law courts acquired jurisdiction in each particular case by virtue of the *writ*, which could only be issued in cases already provided for and found in the registry of writs, or by the statute of Westminster II. By a narrow construction of the statute of Westminster II, the writs issued by the clerks failed to give proper redress, and often, because of technicalities, no redress at all. Perhaps it was not always intended that they should give complete remedy because that meant simply a residuum of judicial power remaining with the king, not as yet delegated to any of the courts. Hence, applications for relief were allowed to be made to the king, or what amounted to the same thing, to his chancellor. The litigant would go to the chancellor and say, "The Courts tell me that the writ issued by your clerk does not suit my case. Your clerk says he has no other writ to sell me. Writ or no writ, I appeal to you for justice." This was in substance the petition addressed to the chancellor, who, besides being the keeper of the king's seal and his secretary, was also known as the keeper of the king's conscience, and in constant attendance upon his person. Ways and means were devised for granting relief in cases where the common-law writs had failed. In this way grew up a form of relief and a system that has evolved during the centuries into what is now known as the equity jurisprudence. After the establishment of parliamentary government, the courts took their law from the legislative enactment, and their jurisdiction was constantly widened and increased by the many legislative acts that were adopted from time to time.

The judges of all the courts were appointed by the king and could be removed by him at will, until during the reign of William III (1701), it was enacted that the commissions of the judges should be *quamdiu se bene gesserint* instead of *durante bene placito*, as formerly, and they could be removed only by an address to both Houses of Parliament. The chancellor, who presided over the equity jurisdiction, became subject to removal by the king at pleasure, his office being by political tenure.

It will accordingly be seen that it was not until the tenure of judicial office was made independent of the king and the separation of the judiciary from the executive was made effectual, that the independence and power of the courts of law and equity were firmly established; and it was not until these reforms were brought about that the courts were organized and firmly established under the system which prevailed for two centuries prior thereto and so continued until modified by the Judicature Act of 1873.

Prior to the Judicature Act of 1873, the superior courts of England consisted of the common-law courts; namely, the Court of King's Bench (called Queen's Bench in the reign of a queen), the Court of Common Pleas and the Court of Exchequer. These three courts were of about the same importance and rank, although the Court of King's Bench was looked upon as having a pre-eminence, because the chief justice thereof was styled the Lord Chief Justice of England. In addition to these common-law courts, there was, on the equity side, the High Court of Chancery. Other courts were the Admiralty, Probate and Divorce Courts, and the London Court of Bankruptcy. There was also a court known as the Judicial Committee of the Privy Council, and the Court for the Consideration of Crown Cases Reserved. The House of Lords exercised the highest appellate jurisdiction.

By the Judicature Act of 1873, which went into effect in 1875, there was established the Supreme Court of Judicature, consisting of two permanent divisions; one division, under the name of the High Court of Justice, has and exercises original jurisdiction in proceedings formerly brought in the common law, equity, admiralty, probate, divorce and bankruptcy courts hereinbefore mentioned. This court also exercises certain appellate jurisdiction from inferior courts. This act, which created a Supreme Court of Judicature, provided for the administration of law and equity concurrently. Every court has power to grant whatever form of relief the nature of the case may require, whether legal or equitable.

The High Court of Justice is divided into sections named after the old courts; namely, the Court of Chancery, the King's Bench, the Court of Exchequer and the Probate, Divorce and Admiralty Division. The Chancery Division's main work is the equity business, but its powers are not confined to any particular subject matter. The King's Bench Division tries civil cases, with or without a jury, exercises criminal jurisdiction and has appellate jurisdiction from County Courts and magistrates. The Probate, Divorce and Admiralty Division decides as to the validity of wills, grants divorces and manages the admiralty business.

The Chancery Division consists of five justices, with the Lord Chancellor as president; the King's Bench Division consists of 14 justices and the Lord Chief Justice as president; and the Probate, Divorce and Admiralty Division consists of two judges. The criminal jurisdiction of the court is exercised entirely by the King's Bench Division.

The other division of the Supreme Court of Judicature was established under the name of the Court of Appeal. The Court of Appeal has appellate jurisdiction, with such original jurisdiction as may be deemed necessary to dispose of cases on appeal. It consists of four ex officio judges and five ordinary judges, appointed by letters patent. The Court of Appeal is the superior court of record and the highest court of appeal except the House of Lords. In hearing ecclesiastical appeals the court is composed of judges and assessors, the latter being archbishops or bishops of the Church of England.

In addition to these high courts of England there are many inferior courts of criminal and civil jurisdiction. The lowest of criminal courts is that of a Justice of the Peace, sitting singly; sometimes the Justices of the Peace, two or more sitting at the same time, constitute a Court of Petty Sessions and may dispose in a summary way of minor offenses. Justices at the Court of Quarter Sessions are commissioned to determine felonies and other offenses, not including treason, murder, forgery and bigamy. These and other more serious offenses are reserved for the superior courts. The Assize Courts, so called, sit in general in each county twice a year. Sometimes several counties are united together for the Assize Court. In London there is a high criminal court known as the Central Criminal Court, and there are many inferior criminal courts known as Police Courts. The Court of King's Bench has general supervision over all criminal jurisdiction and all criminal courts.

There are a number of civil courts of inferior jurisdiction, in which small claims may be litigated. These are the County Courts and the Borough Courts of Record. The County Courts are of ancient origin, but have been reconstituted and changed from time to time. Their practice and jurisdiction is now regulated by the County Courts Act of 1888.

The civil courts at the present time are the County Courts, the Borough Courts of Record, the High Court of Justice, the Court of Appeal, the House of Lords and the Judicial Committee of the Privy Council.

The Judicial Committee of the Privy Council hears appeals in ecclesiastical matters and also from the colonies.

The House of Lords: Appeal still lies to the House of Lords, to the judicial body known by this name, not to the legislative assembly.

The criminal courts now are the Magistrate Courts, the Borough Courts of Quarter Sessions, the Assizes, the Central Criminal Court, the King's Bench Division of the High Court of Justice and the Court for the Consideration of Crown Cases Reserved.

The Court for the Consideration of Crown Cases Reserved is at present the only criminal court of appeal. It deals only with points of law submitted to it by the judge who presided at the trial.

Courts in the United States.— The judicial system of the United States, like the government, is of two kinds. It consists of the Federal courts, provided for by the Federal Constitution and created and deriving their powers from Congress, and of the courts of the several States, created by the States and provided with laws by the legislatures of the several States. All of these courts follow the common law, except where it has been repealed or statutory laws provided in the place of the common law. The judges of the Federal courts, including those of the Supreme Court of the United States, are appointed by the President, with the consent of the Senate. The judges of the Federal courts hold office during good behavior, their appointment being for life. The Supreme Court of the United States, while having original jurisdiction in certain specified cases, is the highest court of appeal. The Federal courts are usually spoken of as the «United States Courts.»

Federal Courts.— The Federal courts at present are the District Courts, the Circuit Courts of Appeals, the Court of Claims, the Court of Custom Appeals and the Supreme Court of the United States.

The United States is divided into judicial districts, which districts comprise a State or Territory or a portion of a State, it being necessary to divide the largest States into several districts. By the Judicial Code of 1911, each district is provided with a District Court, for which there is appointed at least one judge, who is called a District Judge and who receives a salary of $6,000 a year. These District Courts exercise equity, common law, criminal, admiralty and bankruptcy jurisdiction. Their jurisdiction covers suits when the matter in controversy exceeds $3,000 and arises under the Constitution or the laws of the United States, or under treaties, or between citizens of different States, or between citizens of a State and foreign states, or citizens of foreign states; all suits brought by the United States; all crimes and offenses under the laws of the United States; admiralty and maritime causes; all prizes brought to the United States; all cases under the internal revenue, custom and tonnage laws, under the postal laws, under patent, copyright and trade-mark laws; all cases under the interstate commerce laws, immigration laws and bankruptcy proceedings, and suits against trusts and monopolies. District Courts existed prior to 1911, but they were of limited jurisdiction. By the Act of 1911, the District Courts, then constituted, became the court of original jurisdiction in the respective districts.

The other Federal courts are the Court of Claims, the courts of the District of Columbia, the Territorial Courts and the Court of Custom Appeals. The Supreme Court of the District of Columbia has jurisdiction corresponding to that of the State courts and similar to that of the Federal District Court. It consists of a chief justice and associate justices. The District of Columbia has a Court of Appeals.

The Court of Claims consists of five judges and has authority to hear and determine all claims against the United States, founded upon any law of Congress or regulation of the executive department, or upon any contract, express or implied, entered into with or by the government. It can also be called upon to determine claims which may be referred to it by Congress, also all set-offs, counterclaims, claims of damage or other demand whatsoever on the part of the government against any persons making claims against the government in that court.

The Court of Custom Appeals consists of

five judges and has jurisdiction on appeal as to the laws and regulations of customs revenues and duties.

The Territories of the United States, including Porto Rico and all the Territories acquired by the United States as the result of the Spanish-American War, have been provided with a court, usually called the District Court, with general jurisdiction similar to the State courts. Most of the Territories are also provided with a Supreme Court, which exercises appellate jurisdiction, although, for some of the Territories, provision is made for an appeal to one of the Circuit Courts of Appeals.

In 1910 there was established the Commerce Court to hear appeals in cases affecting the interstate commerce laws. This court was abolished in 1913.

Circuit Courts of Appeals.— The United States is divided into nine judicial circuits. Each circuit comprises several States. In 1891 there was established in each circuit a new court called the Circuit Court of Appeals. These nine new courts were given only appellate jurisdiction. There had existed prior thereto in each circuit a Circuit Court which exercised an extensive original jurisdiction and also an intermediary appellate jurisdiction over the then existing District Courts. The Circuit Courts of Appeals were established for the purpose of relieving the Supreme Court of the United States, in which court there was such an accumulation of appeals that a case could not be heard for years, and for the purpose of expediting the determination of cases, thereby more speedily rendering justice to litigants. These courts have admirably accomplished the double purpose which caused their creation.

All appellate jurisdiction was finally taken from the original Circuit Courts, thereby removing a source of delay in the determination of cases, and in 1911 the Circuit Courts were abolished, and the District Courts, then constituted, were given the original jurisdiction possessed by the Circuit Courts.

A Circuit Court of Appeals consists of three judges, two of whom constitute a quorum. There are appointed by the President circuit judges for each circuit, who receive $7,000 a year. Most of the circuits have three circuit judges, but provision is made by the statute for district judges also to sit on the bench of the Circuit Court of Appeals; it being expressly provided, however, that no district judge can hear in the Circuit Court of Appeals any case which he decided in the District Court.

The Chief Justice and associate justices of the Supreme Court are each assigned to a circuit and are competent to sit as judges of the Circuit Court of Appeals. This right is rarely, if ever, exercised by the Supreme Court justices.

The Circut Courts of Appeals exercise appellate jurisdiction from the district and other courts.

The decision of the Circuit Court of Appeals is final in all cases where jurisdiction is dependent upon diversity of citizenship, in patent, copyright, revenue, criminal and admiralty cases. By the making of their decisions final, relief was afforded the Supreme Court in a constantly increasing number of cases. In order, however, that full and complete justice may be done, whenever special cases arise, requiring further and special consideration, provision was made by Congress for a hearing of any such cases by the Supreme Court; it being provided that the Circuit Court of Appeals may certify any question of law concerning which it desires the instruction of the Supreme Court. The Supreme Court may order any case to be certified to it by the Circuit Court of Appeals for review and determination.

The jurisdiction of the Supreme Court in constitutional cases has not been disturbed. An appeal, therefore, can be taken direct to the Supreme Court from the District Court in any case involving the construction of the Constitution of the United States, in any case in which the constitutionality of any law of the United States, or the validity or construction of any treaty is involved, and in any case in which the constitution or law of a State is claimed to be in contravention of the Constitution of the United States.

As the Federal as well as the State courts are the outgrowth of the English system of judicial tribunals, drawing their precedents from the common law, and being in a measure, so far as practice and precedents are concerned, a continuation of the English colonial courts, prior to the Revolutionary War, they have an equity and common-law side.

State Courts.— The several States of the Union have a system of courts similar in many respects to the Federal courts and those of England. Each State has a court of last resort, which hears and determines all questions of law and equity on appeal from the trial court. The highest court in most of the States is named the Supreme Court, although in many of the States, like New York, for instance, the court of last resort is the Court of Appeals, the Supreme Courts in the State of New York being trial courts, similar in jurisdiction to the Superior or Circuit Courts in many of the States. The judges of these State courts are elected for a term of years by popular vote, like other officers. The State courts have a separate criminal and civil jurisdiction, and the court of final appeal in each State settles all questions on appeal except where a violation of the Constitution of the United States is set up.

Each county in the separate States has its probate and other minor courts, and disposes of crimes and civil actions committed within the county. The counties and towns in each county have justices of the peace and minor courts of limited jurisdiction, like those of the English system, which dispose of minor offenses and determine civil actions. The justices of the peace are usually committing magistrates, who issue warrants of arrest, hold preliminary hearings and commit offenders to await the action of the grand jury or the disposition of their cases by courts higher in criminal jurisdiction.

In the large cities and towns there are many police magistrates and justices of the peace to perform the same duties. In some towns and cities the magistrates and police justices are elected, and in others they are appointed by the mayor, as is the case in New York. There are also in each city minor courts which hear and determine civil actions.

Where a prisoner is held by a magistrate for trial, and is subsequently indicted, he or she is placed on trial on the indictment found, in a court of record of criminal jurisdiction, and, upon conviction, appeals in capital cases directly to the court of last resort. The decision of the court of last resort is final unless an infraction of the Constitution of the United States is alleged, and the case is then taken to the Supreme Court of the United States. In case the Supreme Court of the United States finds that a constitutional right has been violated, it orders a new trial of the prisoner. In the event of a decision adverse to the prisoner the sentence imposed by the trial court is carried out.

A similar rule follows in cases of civil suit where the final appeal is taken to the Supreme Court of the United States. Such appeals from the State courts to the Supreme Court of the United States usually go up on a writ of error.

There are, however, in many of the State courts intermediary courts of appeal, as, for instance, in the State of New York there is the Appellate Division of the Supreme Court, which disposes of many appeals, and from whose decision there is no absolute right to appeal, except in those cases provided for in the Code of Civil Procedure of the State of New York. For instance, an appeal may be taken as a matter of right to the Court of Appeals where there is directly involved the construction of the constitution of the State of New York or that of the United States, or where one or more of the justices of the Appellate Division dissents from the decision of the court.

New York Courts.— In the State of New York the trial courts for civil actions are the Supreme Courts; the Court of Claims; the County Courts in each county, except New York; the Surrogates' Courts in each county; the City Court of the City of New York and the City Courts of certain other cities; Courts of Justices of the Peace in each town and in certain cities and villages (none in New York city); the Municipal Courts of the City of New York and of several other cities.

The trial courts for criminal matters in the State of New York are the Courts of General Sessions, for capital cases and other felonies and also misdemeanors; the Courts of Special Sessions, for cases of misdemeanors and such cases as are specially directed to be tried in such courts; County Courts, with both criminal and civil jurisdiction; Magistrates' Courts and Courts of Justices of the Peace.

As the city of New York, second to London, is, probably, the home of more courts than any other city in the world, a brief résumé of the courts of the city of New York may not be out of place here. The borough of Manhattan, of the city of New York, contains the largest judicial system of the metropolis; the same system is carried out in the other boroughs of the city, the number of parts in the courts in those boroughs being, however, considerably less in number.

There are 18 Trial Terms and eight Special Terms of the Supreme Court sitting in the borough of Manhattan; all these parts, with the exception of one (Trial Term, Part I, Criminal Term) sit or are housed in the County Courthouse, known also as the Supreme Courthouse. The two parts of the Surrogate's Court sit in the Hall of Records.

The jurisdiction of the Supreme Court of the State of New York in law and equity includes “all the jurisdiction which was possessed and exercised by the Supreme Court of the Colony of New York, at any time, and by the Court of Chancery in England on the 4th day of July, 1776; with the exceptions, additions and limitations, created and imposed by the Constitution and laws of the State. Subject to these exceptions and limitations, the Supreme Court of the State has all the power and authority of each of these courts, and exercises the same in like manner.” Certain courts, known as the Courts of Common Pleas, the Superior Courts and the Courts of Oyer and Terminer, the latter a criminal court, were abolished 31 Dec. 1895, and their jurisdiction transferred to the Supreme Court.

Special terms for the hearing of litigated, non-enumerated motions (Special Term, Part I) and for ex parte business (Special Term, Part II) are held in the County Courthouse in the borough of Manhattan every court day in the year.

Special Terms for the hearing of equity cases and enumerated motions are held each month in all or several of the special parts, beginning on the first Monday of each month, except in the months of July, August and September.

Trial Terms, for the trial of jury cases, are held in all or in nearly all of the trial parts at the County Courthouse, each month, beginning on the first Monday of each month, except in the months of July, August and September. Trial Term, Part I, for the trial of criminal cases is held at the Criminal Courts Building.

The Appellate Division of the Supreme Court.— This court holds its sessions in the Appellate Division Courthouse. There is but one term each year; this term usually begins on the first Monday in October and lasts through the month of June, with short recesses. Its jurisdiction is appellate and is final, except in cases duly certified by it to the Court of Appeals.

The Appellate Term of the Supreme Court sits in the County Courthouse. It is presided over by three justices of the Supreme Court who are designated for that purpose by the justices of the Appellate Division sitting in the First Department. This court hears appeals from judgments and orders of the City Court of the City of New York and of the Municipal Court of the City of New York, Borough of Manhattan. An appeal may be taken to the Appellate Division from a decision of the Appellate Term if the justices of the Appellate Term or a justice of the Appellate Division in the same department allows the appeal.

Surrogate's Court.— The Surrogate's Court for the borough of Manhattan, county of New York, has two parts or terms, a Trial Term and a Special Term. All contested probate proceedings must be disposed of at the Trial Term. Motions may be heard at the Special Term. The court has the power to take proof of wills, to admit wills to probate and to revoke probate; to grant and revoke letters testamentary and of administration, to direct and control the conduct and settle the accounts of executors and administrators; to administer justice in all matters relating to the affairs of descedents, according to statutory provisions.

City Court.— The City Court of the City of New York holds its sessions in the brown stone building, known as No. 32 Chambers street, borough of Manhattan, city of New York. The jurisdiction, in general, of this court is limited to the sum of $2,000. Process of this court must be served within the boundaries of the old city of New York. Like the Supreme Court, it has a number of Trial and Special Terms. The court was formerly known as the Marine Court and still has jurisdiction in certain specified causes of action known as marine causes (Code, sec. 317).

The Municipal Court of the City of New York corresponds to a court of a Justice of the Peace in other sections of the State of New York; it has, however, no criminal jurisdiction. It has jurisdiction, with certain exceptions, of actions where the amount claimed in the summons does not exceed $1,000, exclusive of interest and costs; also of summary proceedings authorized by the Code of Civil Procedure to recover the possession of real property situated wholly or partly within the district where the application is made. The city of New York, that is the Greater New York, is divided into 24 districts, in each of which a session of the court is held. Nine of the districts are within the borough of Manhattan, and in this borough the courts sit every court day during 10 months of the year; during the months of July and August the court is held only on such days as the justice presiding in each district designates.

The criminal courts in the borough of Manhattan, city of New York, are as follows: Trial Term, Part I, of the Supreme Court; the Court of General Sessions of the Peace; the Court of Special Sessions of the Peace; the Children's Court of the City of New York; and the City Magistrates' Court.

The first named court, namely, Trial Term, Part I, of the Supreme Court, has jurisdiction to try all crimes and misdemeanors triable within the county of New York and to deliver the jails of the county, according to law, of all prisoners therein. The court sits in the Criminal Court Building. It has, apparently, become the custom to send to this court for trial cases which are considered of great importance or which are expected to take a long time for the trial.

The Court of General Sessions sits in the Criminal Courthouse; it is divided into six parts; there are seven judges, who sit in rotation and who are called Judges of the Court of General Sessions. The six parts have co-ordinate jurisdiction. Each part may be held each month and continue as long as the public interest may require. This court has power to hear, determine and punish all crimes which are triable in the county of New York, including crimes punishable by death or imprisonment for life. Every person convicted in this court of a capital offense has an absolute right of appeal.

The Court of Special Sessions holds its sessions in the Criminal Court Building. There are six parts and 11 justices. Three justices sit in each part. There are no jury trials in this court. The accused, when he appears before the committing magistrate, has the right to elect whether he shall be tried in this court or in the Court of General Sessions; if he elects to be tried in this court, his election must be in writing and jury trial must be expressly waived. Part VI of this court is known as the circuit part and sits in whatever county of the Greater New York city the press of business may require. The Court of Special Sessions has in the first instance exclusive jurisdiction of all misdemeanors committed within the county, except libel.

The Children's Court of the City of New York.— This court is presided over by five judges, one sitting in each of the five counties or boroughs of the city of New York. In the borough of Manhattan the court is held every day in the week, with the exception of Sundays and legal holidays.

City Magistrates' Courts.— These courts are presided over by 42 magistrates; they are divided into two boards, one for the boroughs of Manhattan and the Bronx, the other for the boroughs of Brooklyn, Queens and Richmond. The magistrates are appointed by the mayor. Twenty-three reside in the boroughs of Manhattan and the Bronx. Twelve parts sit in the borough of Manhattan. These courts have jurisdiction to summarily punish those charged with petty offenses and to commit or hold others to await the action of the grand jury. Parts of this court are known as the Women's Night Court, the Men's Night Court, the Domestic Relations Court, the Traffic Court and the Municipal Term Court. Special matters are referred to the various parts.

Supreme Court of the United States.— The Supreme Court of the United States, created in 1789 after much discussion and consideration and after many attacks had been made upon its proposed jurisdiction, now consists of nine justices, including the Chief Justice. The Chief Justice and the associate justices are appointed by the President, with the concurrence of the Senate. The justices are appointed for life and receive a salary of $14,500 a year, with the exception of the Chief Justice, who is paid $15,000 a year. The justices have a retiring pension of the same amount upon reaching the age of 70 years. The Court has original jurisdiction in all cases affecting ambassadors, other public ministers and consuls, and those actions in which a State is a party. It has appellate jurisdiction, which is final, and from its decisions there is no appeal. It even has the power to declare void acts of Congress, or of the States, which it finds in conflict with the Federal Constitution. This great court has always upheld the national character of the Federal government, and has, while indicating the national policy, carefully guarded the reserved rights of the several States. Its decisions have not been confined to narrow questions of commercial law, but have interpreted the Constitution and established the welfare of the nation. Within the great powers exercised by it, it restricts congressional acts to constitutional limits. Its jurisdiction extends over sovereign States as well as over the humblest of its citizens. It has power to annul the statutes of any State in the Union whenever any such statute violates the Constitution and is in violence to civil right, the contracts, the currency or the intercourse of the people.

Hampton L. Carson, in his 'History of the United States Supreme Court,' says: "The establishment of the Supreme Court of the United States was the crowning marvel of the wonders wrought by the statesmanship of America. In truth the creation of the Supreme Court with its appellate powers was the greatest conception of the Constitution. It embodied the loftiest ideas of moral and legal power, and although its prototype existed in the superior courts of the various States, yet the majestic proportions to which the structure was carried became sublime. No product of government, either here, or elsewhere, has ever approached it in grandeur. Within its appropriate sphere it is absolute in authority. From its mandates there is no appeal. Its decree is law. In dignity and moral influence it outranks all other judicial tribunals of the world. No court of either ancient or modern time was ever invested with such high prerogatives.»

The third article of the Federal Constitution provides for the establishment of the Federal courts. It embodies in three sections the system from which has been developed the greatest and wisest judicial system the world has ever known.

Section 1 vests the judicial power of the United States in one Supreme Court, and in such inferior courts as Congress may from time to time ordain and establish, and regulates the tenor of office of all Federal judges, prescribing their good behavior and guaranteeing their compensation against diminution.

Section 2 provides that the judicial power shall extend to all cases in law and equity arising under the Constitution, the laws of the United States, and treaties made, or which shall be made, under their authority, to all cases affecting ambassadors, other public ministers and consuls, to all cases of admiralty and maritime jurisdiction; to controversies to which the United States shall be a party; to controversies between two or more States, between a State and citizens of another State, between citizens of different States, between citizens of the same State claiming lands under grants of different States, and between a State, or the citizens thereof, and foreign states, citizens or subjects. It also provides that in all cases affecting ambassadors, other public ministers and consuls and those in which a State shall be a party, the Supreme Court shall have original jurisdiction. In all other cases before mentioned the Supreme Court shall have appellate jurisdiction both as to law and fact, with such exceptions and under such regulations as the Congress shall make. Section 2 also provides that the trial of all crimes, except in cases of impeachment, shall be by jury and that such trials shall be held in the State where the said crime shall have been committed; but when not committed within any State, the trial shall be at such place or places as the Congress may, as by law, direct.

Section 3 provides: 1. Treason against the United States shall consist in levying war against them, or in adhering to their enemies, giving them aid and comfort. No person shall be convicted of treason unless on the testimony of two witnesses to the same overt act or on confession in open court. 2. The Congress shall have power to declare the punishment of treason, but no attainder of treason shall work corruption of blood or forfeiture, except during the life of the person attainted.

Before the adoption of the Constitution the great importance of such a court as the Supreme Court of the United States was discussed. As early as May 1783, Alexander Hamilton called attention to the grievous defect in the Articles of Confederation in failing to provide a Federal court of last resort, especially for the settlement of matters involving foreign nations. In the *Federalist* he wrote: «Laws are a dead letter without courts which found and define their true meaning and operation. The treaties of the United States, to have any force at all, must be considered as part of the law of the land. Their true import, as far as respects individuals must, like all other laws, be ascertained by judicial determination. To produce uniformity in these determinations they ought to be submitted as a last resort to one supreme tribunal, and this tribunal ought to be instituted under the same authorities which form the treaties themselves.»

James Madison and other statesmen of that day held practically the same view. It was from such ideas as these expressed by Mr. Hamilton and concurred in by his contemporaries that the Supreme Court of the United States took its rise, and when the main business of the Constitutional Convention was begun, 28 May 1787, a provision for the creation of a national judiciary was suggested, among a series of 15 resolutions relating to the adoption of the Constitution, commonly known as the Virginia plan. The clause relating to the judiciary provided as follows: «That a national judiciary be established, to consist of one or more supreme tribunals, and of inferior tribunals to be chosen by the national legislature. The judges to hold their office during good behavior, and to receive punctually, at stated times, fixed compensation for their services, in which no increase or diminution shall be made so as to affect persons actually in office at the time of such increase or diminution; that the jurisdiction of the inferior tribunals shall be to hear and determine, in the first instance, and the supreme tribunal in the *dernier ressort,* all piracies and felonies on the high seas, captures from an enemy, cases in which foreigners or citizens of other States applying to such jurisdiction may be interested, or which respect the collection of the national revenues, the impeachment of any national officers and questions which may involve the national peace or honor.»

A resolution that a national judiciary be established was unanimously passed by the convention, which was made up chiefly of lawyers and four judges. Then followed a vigorous and protracted discussion as to the formation and the method of selecting the various judges. John Rutledge was against establishing any national tribunal except a single supreme one, and he contended that the State tribunals might and ought to be left in all cases to decide in the first instance as to the right of appeal to the supreme national tribunal. He contended that to do otherwise was making an unnecessary encroachment on the jurisdiction of the States. He was supported in these contentions by Roger Sherman. After the various plans and suggestions had been fully discussed, the convention committed to the people of the United States, on 17 Sept. 1787, the Constitution, containing the article (3) relative to the formation of the Federal judiciary.

The first Congress to meet after the ratification of the Constitution, which was summoned to meet in New York, as the seat of government, on 4 March 1789, did not convene until the beginning of April, and after the counting of votes it declared Washington President-elect. His inauguration followed on 30 April, but there was no Federal judge to administer the oath required by the Constitution, and this service was performed by Robert R. Livingston, the first chancellor of the State of New York, under the constitution of that State of 1777. Having had its attention called in this striking manner to the fact that the new Federal government was without a single judge, Congress, the day after its organization, began the preliminary work for the establishment of a judiciary by appointing a committee, of which Oliver Ellsworth, one of the framers of the Constitution, and afterward Chief Justice of the Supreme Court, was chairman. The judicial act which set in operation the Supreme Court of the United States, and the other courts of the United States, was the work of Ellsworth. It was approved by Washington, 24 Sept. 1789.

The first section of this act provides that the Supreme Court of the United States shall consist of a Chief Justice and five associate justices (now increased to eight), any four of whom shall constitute a quorum, and shall hold annually, at the seat of government, two sessions, the one commencing the first Monday of February and the other the first Monday of August. The Senate promptly confirmed Washington's appointment of John Jay, of New York, to be the Chief Justice of the Supreme Court. Washington appointed and the Senate confirmed, as associate justices, John Rutledge, of South Carolina; William Cushing, of Massachusetts; Robert H. Harrison, of Maryland; James Wilson, of Pennsylvania, and John Blair, of Virginia. Of these, Jay, Cushing and Harrison had served as chief justices in their own States; Rutledge, Wilson and Blair as members of the convention that framed the Constitution. Harrison declined to serve and his place was afterward filled by the appointment of James Iredell, of North Carolina.

The first Monday of February,— it was the first day of the month — 1790, being the day fixed for the opening session of the Supreme Court of the United States, in the city of New York, which was then the capital of the Federal government, Chief Justice Jay and Justices Cushing and Wilson appeared in the court room, which had been provided at the Exchange, Federal Hall being occupied by Congress. A quorum was not present and the court adjourned to the following day, when, Justice Blair having arrived with Edmund Randolph, the first Attorney-General, the Supreme Court of the United States was open for its first session. Chief Justice Jay wore on that occasion a robe of black silk with salmon-colored facings on the front and sleeves. This robe was, according to family tradition, the academic gown of a Doctor of Laws of the University of Dublin, which had recently conferred this degree upon the new chief justice. The associate justices wore the ordinary black robes which have since been used by all the members of the court. Richard Wenman was appointed "crier," and made proclamation that the Supreme Court was open. John Tucker, of Massachusetts, was appointed first clerk of the court. After a seal had been adopted, the roll of attorneys and counsellors was opened. The first name on the roll of counsellors was that of Elias Boudinot, of New Jersey, a Revolutionary patriot, who was conspicuous in the Continental Congress and later in the first Congress of the United States.

After holding a few formal sessions the court adjourned for lack of business, 10 February. In 1791 the Supreme Court was removed to Philadelphia, then the seat of the Federal government, where it continued to sit during term time for 10 years, the court room being on the second floor of the City Hall, at the corner of Fifth and Chestnut streets. In 1801 the court was removed to Washington, where it has remained ever since. On the day of the first meeting of the Supreme Court of the United States in the city of Washington, 4 Feb. 1801, John Marshall sat as Chief Justice for the first time.

Chief Justices.— Since 1790 the Supreme Court of the United States has had only nine chief justices, namely: John Jay, of New York; John Rutledge, of South Carolina; Oliver Ellsworth, of Connecticut; John Marshall, of Virginia; Roger B. Taney, of Maryland; Salmon P. Chase of Ohio; Morrison R. Waite, of Ohio; Melville W. Fuller, of Illinois, and Edward D. White of Louisiana, who is the present Chief Justice.

The Supreme Court (q.v.) at present consists of Chief Justice Edward D. White, of Louisiana, and Associate Justices Joseph McKenna, Oliver Wendell Holmes, William R. Day, Willis Van Devanter, Mahlon Pitney, James Clark McReynolds, Louis D. Brandeis and John H. Clarke.

CAMPBELL CARRINGTON.

COURT, Presentation at, a formal presentation to the sovereign of Great Britain of persons whose official, social or intellectual standing entitles them to that honor. It takes place either at Saint James' Palace, at a levee, intended for gentlemen only, or at Buckingham Palace, a drawing-room, where both ladies and gentlemen appear. The days when levees and drawing-rooms are to be held are always announced some time beforehand. It is difficult in the present day to define exactly who may and who may not be entitled to be presented. Members of families of the nobility and landed gentry, diplomats, members of the House of Commons, persons holding high offices under the Crown, judges, magistrates, Church dignitaries, officers in the army and navy, persons who have attained eminence of any kind, foreign ambassadors, members of their staffs and strangers of distinction, and the wives and daughters of the same classes, form the larger number of those presented at levees and drawing-rooms. Persons are often presented on entering on some office or attaining some dignity. Any one who has been once presented is entitled to appear at any future levee or drawing-room without a new presentation. The whole arrangements connected with presentations are under the supervision of the lord chamberlain, in whose office in Saint James' Palace information is given to all persons wishing to be presented. The names of ladies and gentlemen desiring presentation, and of the ladies, noblemen and gentlemen who are to present them, have to be submitted to the sovereign for approval and there is a strict exclusion of persons of damaged reputation, whatever their rank. Court dress or official uniform must be worn. A British subject who has been presented at Saint

James' may on any after occasion claim to be presented by the British Minister at any foreign court. For information as to court dress both for ladies and gentlemen, court etiquette, court mourning, etc., consult Armytage, Hon. Mrs., 'Old Court Customs and Modern Court Rule' (London 1883).

COURT OF APPEALS. See COURT; UNITED STATES COURTS.

COURT OF APPEALS IN CASES OF CAPTURE (1780–87), the chief Federal court prior to the establishment of the Supreme Court, which in a sense grew out of it. From the nature of the revolt against Great Britain, the colonies were very loath to erect any new plenary power to decide their mutual disputes, which would also create new disputes between it and themselves. The first clash of jurisdictions came on the question of naval prizes. As early as the autumn of 1775 cruisers were capturing British vessels off the Eastern coast, part under commission from Massachusetts, part from the Continental Congress (see CONTINENTAL NAVY); and Washington, conducting the siege of Boston, was appealed to for determination of conflicting claims, there being neither provincial nor Federal courts for trial and condemnation of captures. On 11 November he suggested to Congress to establish such a court; on the 25th it recommended to the colonies to erect them, reserving an appeal to itself or such persons as it appointed. The act, however, provided neither court, procedure nor method of enforcement, did not define the source or limits of its jurisdiction and had the same defects as the entire Confederation proceedings. (See CONFEDERATION, ARTICLES OF). Washington criticized it on the first ground. Nor would Congress take original jurisdiction, but only appellate. Several appeals were referred to special committees; then, on 30 Jan. 1777, a special committee on revision of prize methods reported in favor of the creation of a standing committee of five to hear all such appeals. This was appointed, and the following March three more were added, but it was too large, and was shortly reduced to five again, with three as a competent quorum. But Washington's suggestion was evidently the right one, and on 5 Aug. 1777 it was moved to consider the establishment of a permanent court. This was discussed for over two years, and not finally acted on till 15 Jan. 1780. Meantime a case had come up which forced some new method on them. Four Connecticut men in the fall of 1778 had been captured by the British and compelled to help navigate the sloop *Active* toward New York, then in British hands; they recaptured it from the British crew, and were steering it for a patriot port when a Pennsylvania privateer captured them and claimed the sloop as prize. A Pennsylvania jury gave the Connecticut men one-fourth of the prize, and divided the rest between the privateers and the State of Pennsylvania. The Connecticut men appealed to Congress, which reversed the decision; the Pennsylvania judge refused to admit its authority, and ordered the sloop and cargo sold and the proceeds divided. (It should be said that the State admiralty act prohibited appeal or rehearings). The committee thereupon refused to hear any more cases till its jurisdiction was settled. Congress resolved that such cases could not be left to self-interested State decision, but that it would not prejudice the Union by resort to force; and the Connecticut men only obtained their rights many years later through the Supreme Court. After futile conferences with State legislative committees, an act was passed establishing a Federal "Court of Appeals in Cases of Capture," to hold sessions first in Philadelphia, and then anywhere they pleased between Hartford, Conn., and Williamsburg, Va. But like all other enactments of the time, it was shorn of its needful powers: it could not fine or imprison for disobedience, the State courts were not to execute its decrees and no marshal was appointed. No tenure, either of definite time or good behavior, was assigned to the judges. Three of these were appointed, but one of them died soon after, and the other two performed the duties for two years, when another resigned and two others were chosen. But the cases were gradually decided after the war, and on 23 Dec. 1784 the docket was reported empty. The judges were still retained, but their salaries were abolished, except for a *per diem* allowance when in actual service. About this time the States began to constitute courts of appeal, to take matters out of the hands of the Federal court. The defeated parties, however, insisted on appeals to the latter, and on 27 June 1786 Congress resolved that these should be heard. The last session of the court was on 16 May 1787 at Philadelphia, while the Convention of 1787 (see CONSTITUTION, FRAMING OF) was framing the Supreme Court. Consult Carson, 'The Supreme Court of the United States: Its History' (1892).

COURT BARON, in England, a court composed of the freeholders of a manor, presided over by the lord of the manor or his steward. Its business was to administer the laws or custom of the manor and to admit tenants who had acquired copyholds (q.v.) by inheritance or purchase and had to pay a fine to the lord of the manor. The institution still exists for the conducting of this latter business, but is presided over by the steward of the manor; and its proceedings are carefully recorded. Consult Pollock and Maitland, 'History of English Law' (2d ed., London 1899); Gurdon, 'History of Court Baron and Court Leet' (Selden Society 1731).

COURT CEREMONIAL, certain forms of international etiquette or usage, which have arisen in Europe during modern times. No independent state can actually have precedence of another; but as the weaker seek the protection and friendship of the more powerful, there arises a priority of rank. The origin of elaborate formalities is to be traced to the Eastern nations, who for ages have practised various forms expressing reverence for exalted personages. By a gradual establishment of dignities, rank and acts of respect to states, their rulers and representatives, (in contradistinction to the internal etiquette of a state) an international ceremonial has been formed, that has been the source of confusion and war, to its observance far more consideration being often paid than to the fulfilment of the most sacred contracts. Louis XIV carried this folly further, perhaps, than any one before or after him. To this international ceremonial belong:

1. Titles of rulers. Accident made the imperial and regal titles the highest, and thus conferred advantages apart from the power of the princes. After Charlemagne, the emperors of the Romans were considered as the sovereigns of Christendom, maintained the highest rank and even asserted the dependence of the kings on themselves. For this reason several kings in the Middle Ages, to demonstrate their independence, likewise gave their crowns the title of «imperial.» England, for example, in all its public acts, is still styled the «imperial crown.» The kings of France received from the Turks and Africans a title equivalent to emperor of France. In progress of time the kings were less willing to concede to the imperial title, of itself, superiority to the royal.

2. Acknowledgment of the titles and rank of rulers. Formerly the popes and emperors arrogated the right of granting these dignities; but the principle was afterward established that every people could grant to its rulers at pleasure a title, the recognition of which rests on the pleasure of other powers and on treaties. Some titles were therefore never recognized, or not till after the lapse of considerable time. This was the case with the royal title of Prussia, the imperial title of Russia, the new titles of German princes, etc.

3. Marks of respect conformable to the rank and titles of sovereigns. To the «royal» prerogatives, so called (conceded, however, to various states which were neither kingdoms nor empires, such as Venice, the Netherlands, Switzerland and the electorates), pertained the right of sending ambassadors of the first class, etc. In connection with this there is a much contested point, namely, that of precedence or priority of rank, that is, of the right of assuming the more honorable station on any occasion, either personally, at meetings of the princes themselves, or of their ambassadors, at formal assemblies, etc., or by writing, as in the form and signature of state papers. There is never a want of grounds for supporting a claim to precedence.

As the councils in the Middle Ages afforded the most frequent occasion of such controversies, the popes often intervened. Of the several arrangements of the rank of the European powers which emanated from the popes, the principal is the one promulgated in 1504 by Julius II, through his master of ceremonies, in which the European nations followed in this order: (1) the Emperor of the Romans (Emperor of Germany); (2) the King of Rome; (3) the King of France; (4) the King of Spain; (5) of Aragon; (6) of Portugal; (7) of England; (8) of Sicily; (9) of Scotland; (10) of Hungary; (11) of Navarre; (12) of Cyprus; (13) of Bohemia; (14) of Poland; (15) of Denmark; (16) Republic of Venice; (17) Duke of Bretagne; (18) Duke of Burgundy; (19) Elector of Bavaria; (20) of Saxony; (21) of Brandenburg; (22) Archduke of Austria; (23) Duke of Savoy; (24) Grand-Duke of Florence; (25) Duke of Milan; (26) Duke of Bavaria; (27) of Lorraine. This order of rank was not, indeed, universally received, but it contained a fruitful germ of future quarrels; some states, which were benefited by the arrangement, insisting upon its adoption, and others, from opposite reasons, refusing to acknowledge it. To support their claims for precedence the candidates sometimes relied on the length of time which had elapsed since their families became independent, or since the introduction of Christianity into their dominions; sometimes on the form of government, the number of crowns, the titles, achievements, extent of possessions, etc., pertaining to each. But no definite rules have been established by which states are designated as being the first, second, third, fourth, etc., rank. Rulers of equal dignity, when they make visits, concede to each other the precedence at home; in other cases, where the precedence is not settled, they or their ambassadors take turns till a compromise is effected in some way. In Great Britain and France far less ceremonial is observed, in the official style, than in Germany. Emperors and kings mutually style each other «brother,» while they call princes of less degree «cousin.» The «we,» by which monarchs style themselves, is used either from an assumption of state or from a feeling of modesty, on the supposition that «I» would sound despotical, while «we» seems to include the whole administration, etc. The French Revolution destroyed the too elaborate ceremonial of the French court; it was revived to a degree by Napoleon, and still further after the Bourbon Restoration, but disappeared entirely on the establishment of the Third Republic. In England court ceremonial was considerably abridged under Victoria, but was restored under Edward VII and continued by George V.

COURT OF CHANCERY. See COURT; ENGLISH COURTS.

COURT OF CLAIMS. See COURT; UNITED STATES COURTS.

COURT DE GEBÉLIN, koor dẹ jĕ-bĕ-lăṅ, **Antoine**, French scholar, only son of Antoine Court (q.v.): b. Nimes, 25 Jan. 1725; d. Paris, 10 May 1784. After receiving a good education he became pastor of the Reformed Church, but his natural tendency and ambition caused him to abandon the calling for literary pursuits. After his father's death he went to Paris to gather materials for a comprehensive study of the languages and mythologies of the ancient world. This long research finally appeared in nine volumes, still unfinished in 1784. He continued to work for the Protestant cause, publishing in 1760 a work entitled 'Les Toulousaines, ou lettres historiques et apologétiques en faveur de la religion réformée,' and he founded at Paris an agency for stirring up sympathy for the sufferings of his co-religionists. He supported the idea of the independence of America and the liberal political opinions of Quesnay. Bad investments of money impoverished his old age. Consult Dardier, Charles, 'Court de Gebelin' (Nimes 1890).

COURT OF HIGH COMMISSION, a court which was established in Queen Elizabeth's reign, and exercised powers like those which during the reign of Henry VIII had been entrusted to Lord Cromwell. The judges had the power of arresting suspected persons, imprisoning, torturing them and causing them to accuse their confederates or their friends. They could impose new articles of faith and impose them on recalcitrant consciences by compulsion of the severest and most odious kind. It was abolished for abuse of power in 1641.

COURT OF HONOR, a court of chivalry, of which the lord high constable was judge, for the purpose of settling such disputes as had commonly been settled by duels. It was a continuation of what in the time of Henry IV was called *curia militaris,* military court. Suggestions have been made from time to time for the establishment of courts of honor, but the law has made provisions for settling larger affairs of offense against honor, such as libel, slander, etc., and the need of special court is not apparent. See DUEL.

COURT OF LIONS. See ALHAMBRA.

COURT OF LOVE (Fr. *cour d'amour*), in mediæval France and Germany, a tribunal composed of ladies illustrious for their birth and talent, whose jurisdiction, recognized only by courtesy and opinion, extended over all questions of gallantry. Such courts existed from the 12th to the 14th century, while the romantic notions of love which characterized the ages of chivalry were predominant. The decisions were made according to a code of 31 articles, which have been preserved in a manuscript entitled 'De Arte Amatoria et Reprobatione Amoris,' written by André, royal chaplain of France, about 1170. Some of the troubadours were often present to celebrate the proceedings in verse, and the songs of these minstrels were not unfrequently reviewed and judged by the tribunals. Among the ladies who presided were the Countess De Die, called the Sappho of the Middle Ages; Queen Eleanor of Guienne and her daughter, Marie de Fauce, Countess of Champagne, and Laura de Sade, celebrated by Petrarch. There was such a court in Provence in the days of the Troubadors. The following case was submitted to their judgment: A lady listened to one admirer, squeezed the hand of a second and touched with her toe the foot of a third. With which of these three was she in love? King René of Anjou attempted in vain to revive the courts of love, and the last imitation of them was held at Ruerl at the instance of Cardinal Richelieu, to judge a question of gallantry, which had been raised in the Hôtel de Rambouillet. Consult Meray, 'La vie au temps des cours d'amour' (Paris 1876), and Reynouard, 'Choix de poésies originales des troubadours' (Vol. II, ib. 1817).

COURT-MARTIAL. See LAW, MILITARY.

COURT-PLASTER, so called because originally applied by ladies of the court as patches on the face; black, flesh-colored or transparent silk varnished over with a solution of isinglass, which is often perfumed with benzoin. It is used for covering slight wounds.

COURT OF PRIVATE LAND CLAIMS. See COURTS; UNITED STATES COURTS.

COURT OF SPECIAL SESSIONS. See COURT; UNITED STATES COURTS.

COURTENAY, koort'nā or kẽrt'nā, **Edward Henry,** American mathematician: b. Maryland 1803; d. Charlottesville, Va., 21 Dec. 1853. He was graduated at West Point in 1821, and was professor of philosophy there 1821–34, and professor of mathematics at the University of Pennsylvania 1834–36. After several years devoted to civil engineering he was professor of mathematics in the University of Virginia 1843–53. He was an engineer in the construction of Fort Independence in Boston harbor 1837–41, and was chief engineer of the dry-dock work in the Brooklyn Navy Yard. He published 'Treatise on Differential and Integral Calculus' and 'Calculus of Variations.' He translated and edited the 'Elementary Treatise on Mechanics of Boucharlat' (1883).

COURTESY, or **CURTSEY,** the estate to which by common law a man is entitled on the death of his wife in the lands or tenements of which she had possession in fee simple or in tail during their coverture, provided they have had lawful issue born alive, which might have been capable of inheriting the estate. The origin of this custom and its name is English in England, but the same law existed also in Normandy and still holds in Scotland. In the United States the law differs in various States, but has generally been supplanted by other laws.

COURTESY TITLE, a title assumed by or given to any person by common consent as an act of courtesy or respect, not of absolute right. See TITLES OF HONOR.

COURTHOPE, kōrt'hōp, **William John,** English scholar: b. 17 July 1842. He was educated at Harrow and Oxford, was first civil service commissioner in 1892 and professor of poetry at Oxford 1895–1901. He is author of 'Ludibria Lunæ' (1869); 'Paradise of Birds' (1870); 'Life of Addison' (1882); 'History of English Poetry' (6 vols., 1895–1909); 'Life in Poetry'; 'Law in Taste' (1901); 'The Longest Reign.' He was appointed C.B. in 1892, and both Durham and Edinburgh conferred honorary degrees on him. In 1906 he became Fellow of the British Academy of Letters and of the Royal Society of Literature in 1907. He was editor of the last five volumes of the standard edition of Pope (10 vols., 1871–89), which was begun with Whitwell as editor.

COURTIS, Stuart Appleton, American educator: b. Wyandotte, Mich., 15 May 1874; educated at Detroit Business University, Massachusetts Institute of Technology, University of Chicago and Columbia University. He was head of the department of science and mathematics in the «Liggett School» Home and Day School, Detroit, from 1898 to 1914, when he became superintendent of educational research in the Detroit public schools. At the same time he held the position of director of the department of measurements for the University of Oklahoma from 1913. He is the originator of Courtis' «standard tests,» a system for the measurement of the efficiency of school work. He was a member of the Hanus Committee on School Inquiry held in New York in 1911. He is well known as a lecturer and contributor to magazines.

COURTIS' TESTS. For several years Stuart Appleton Courtis (q.v.), in the discharge of his duties as head of the department of science and mathematics in the Detroit Home and Day School, made use of comparative tests for purposes of supervision. During this time a gradual evolution of these tests took place; and they finally assumed the shape of an attempt to apply scientific methods to the teaching of the fundamentals in reading, writing, arithmetic and English subjects so as to make possible rapid and reliable measurements of the effects of teaching through testing work practicable under classroom conditions. After considerable comparative investigation along experimental lines, «Series A,» the first of the Courtis' Tests, was published and 18,000 copies were sold at cost or given away as a preliminary to a comparative investigation to determine standard scores. Failure after failure met these attempts to control individual variation; but a test of 5,000 children in Detroit and 33,000 in New York schools for the Hanus Committee on School Inquiry provided the necessary scope and opportunity for the standardization of the tests in 1911. The result of these tests shows that «the supreme factor in education is the variation of the natural abilities of children.» Courtis came to the conclusion, therefore, that «new educational methods that would give each child a chance to develop in his own way and along his own lines would have to be invented.» He experimented along the same lines in the Boston schools in 1912. In October and again in March 20,000 children were tested and several experimental methods of giving assistance to individuals were put into practice in the schools tested. These original tests were applied principally to the teaching of arithmetic; but as it was found that this was not a broad enough basis on which to work, other tests were applied to the teaching of reading and writing.

The Courtis' Tests are divided as follows: (1) *Diagnostic.* To make evident the actual conditions existing in schools, classes and individuals that the weaker points may be noted, cause determined and remedies devised. (2) *Scientific.* To discover the natural laws of mental developments operative in school work. (3) *Experimental.* To make possible control experiments that will settle all questions of educational procedure upon a fact basis, through scientific determination of the efficiency of different methods. (4) *Supervisory.* To secure the information needed in setting standards for the guidance of teachers and schools and in determining whether or not standards already set are being attained. The Courtis tests have been defined as «a correspondence course in educational measurements.» By means of printed tests, folders of instruction, records and graphic sheets superintendents and teachers are enabled to carry on experimental work with a minimum of effort. The tests «aim to secure information for the formation of reasonable aims in terms of objective standards; to measure the efficiency of methods designed to produce desired results; to obtain knowledge of the factors and natural laws of teaching and learning; and to enable comparisons of school with school, or teacher with teacher, to be made upon a scientific, impersonal, objective basis.» The Curtis tests differ from those of Binet (q.v.) in that they are more scientific, more carefully worked out by means of co-operation; and that there is but one set of tests for children of all ages. The giving of exactly the same tests under identical conditions to all persons examined is an essential feature of the method and distinguishes it from previous methods. The standardized tests cover arithmetic, writing, dictation, reading, spelling, punctuation, reproduction and the comparison of all the work done by the pupil. Consult Courtis, S. A., ‹Manual of Instructions for Giving and Scoring the Courtis' Standard Tests› (Detroit 1914); ‹Better Teaching in Arithmetic› (Detroit 1913); ‹Teachers' Manual› (Yonkers 1914).

COURTMANS, koor-män', **Joanna Desideria Berchmans,** Flemish poet and novelist: b. Oudegem, East Flanders, 6 Sept. 1811; d. Maldegem, 6 Sept. 1890. She was married in 1836. Besides dramas and poems, she wrote 22 volumes of stories. She excelled particularly in her descriptions of the life of the common people. The most notable of her tales are ‹Het geschenk van den jager,› which won the Flemish literature prize in 1864; ‹De zwarte Hoeve› (2d ed., 1866); ‹De Koewachter› (1873); ‹De Hoogmoedige› (1882).

COURTNEY, Leonard Henry, 1st Baron Courtney of Penwith, English writer and politician: b. Penzance, Cornwall, 6 July 1832; d. London, 11 May 1918. The son of a banker, he was educated at Cambridge University and became a barrister in 1858. He engaged in literary and journalistic work, dealing mainly with economic, historical and statistical topics. Elected to Parliament as a Liberal in 1877, Courtney successively held the under-secretaryships of the Home Department and Colonial Office, and in 1882 was made Financial Secretary of the Treasury. His political career was characterized by a peculiar opposition to nearly all popular causes. He opposed Home Rule, the first annexation of the Transvaal and Redistribution. In 1886 he went over to the Unionist side and became deputy-speaker in the Commons. He broke out into opposition again by advocating the evacuation of Egypt, and later denounced the South African War, which lost him his seat in the 1900 election. He received his peerage from the Liberal government in 1906. On the European War question he advocated peace by negotiation. He left no heir to the title.

COURTNEY, William Leonard, English author: b. Poona, India, 5 Jan. 1850. He was educated at Oxford, became editor of the *Fortnightly Review* in 1894 and has served on the editorial staff of the *Daily Telegraph.* He has published ‹The Metaphysics of John Stuart Mill› (1879); ‹Studies on Philosophy› (1882); ‹Constructive Ethics› (1886); ‹Studies New and Old› (1888); ‹Life of John Stuart Mill› (1889); ‹Studies at Leisure› (1892); ‹Kit Marlowe,› a play (1893); ‹The Idea of Tragedy› (1900); ‹Undine› (1902); ‹The Feminine Note in Fiction› (1904); ‹The Literary Man's Bible› (1907); ‹The Literary Man's New Testament› (1915), etc.

COURTOIS, koor-twä', **Bernard,** French chemist: b. Dijon 1777; d. Paris, 27 Sept. 1838. He was trained in pharmacy and entered Fourcroy's laboratory in the École polytechnique. He had to join the army in 1799, but after his discharge resumed his chemical work with Thénard and Séguin. In conjunction with the latter he discovered morphine in opium, but nothing was published on the subject till Séguin's paper long after, and Courtois' share has consequently been overlooked. In 1804 he began work on nitrate of sodium, the process consisting in decomposing nitrate of calcium by the carbonate of sodium obtained from kelp. In the course of his operations he observed that the iron vessels were corroded if the liquors from which the sodium salts had been crystallized were kept in them for a time. Investigating the cause of this, he found that on distilling the liquors with sulphuric acid a body with a splendid purple vapor was liberated. He examined it and ascertained some of its properties; for instance, its formation of a detonating compound with ammonia, and then gave a specimen of it to Clément, who read a paper on it, and ultimately resigned the investigation to Gay Lussac. This was the first discovery of iodine. In 1815 his nitre manufacture was ruined, and thereafter he had a precarious livelihood by making various chemical products.

COURTOIS, Gustave Claude Étienne, French painter: b. Pusey, 18 March 1852. He studied at Paris as a pupil of Gérôme; first exhibited in the Salon in 1876; won the first-class medal at the Paris Exposition of 1889. His works include 'The Death of Archimedes'; 'Narcisse' (in the Luxembourg); 'Dante and Virgil in Hell'; 'Bayadere'; 'The Burial of Atala'; and a number of portraits. At the Saint Louis Exposition in 1904 he exhibited 'Adam and Eve in Eden'; 'Cupid Feasting' and a portrait of Mme. G. From 1880–90 he was the most fashionable portrait painter in Paris.

COURTOIS, Jacques (It. Jacopo Cortese), surnamed le Bourguignon (It. Il Borgonone), French painter: b. Saint Hippolyte, Doubs, 1621; d. Rome, 14 Nov. 1676. He was a pupil of his father, Jean Courtois, but went to Italy in 1636 and served three years with the Spanish army in Lombardy. He then studied at Bologna, Florence, Siena and Rome, where he came under the influence of Guido Reni and Francesco Albani in Bologna, and Pieter de Laar in Rome. He was especially eminent in battle-pieces. His wife dying of poison, which he was suspected of having administered, he took the habit of a lay brother of the Jesuits, with whom, though he still practised his art, he remained till his death. His brother William (d. 1679) was also an eminent painter who excelled in historical pieces, and assisted Jacques in some of his works. His pictures are to be found in nearly all of the galleries of Europe.

COURTRAI, koor-trā, Belgium, a fortified town in the province of West Flanders, on the Lys River, 26 miles south of Ghent. It is well built, having handsome and spacious streets and a fine Grande Place, with several other squares. Its manufactures are table linens, lace — which is celebrated for its beauty of design and exquisite workmanship — cambrics, cotton goods, etc., and it has extensive bleaching and dyeing works. Here, in 1302, took place the «battle of spurs» between the French and Flemings. It was in German occupation during the Great European War. Pop. 35,872.

COURTSHIP OF MILES STANDISH, The, the title of a poem by Longfellow. It is written in hexameter measure and was first published in 1858.

COUSIN, koo-zăṅ, **Jean, The Elder,** French artist: b. Soucy, near Sens, France, 1501; d. Sens about 1590. He is generally regarded as the earliest French historical painter. He chiefly painted on glass, but his 'Last Judgment,' painted on canvass for the convent of the Minims at Vincennes, is esteemed an excellent work. In 1540 he designed the festive decorations for the entry of Emperor Charles V at Paris. Noteworthy among his sculptured works are the tomb of Admiral Chabot (Louvre) and the sculptures formerly in the chapel of Pagny (Burgundy). A large number of wood cuts have also been credited to him. He was the author of 'Livre de perspective' (1560) and 'Livre de portraiture' (1571). His son, Jean the Younger, also an artist: b. Sens about 1522; d. 1594. He designed the glass windows and possibly the sculptures of the castle of Fleurigny at Sens. The glasses in the church of Saint-Gervais, Paris, are also attributed to him. He painted five portraits of the Bouvyer family. He wrote a book on the 'True Science of Portraiture' and a 'Book of Fortune' containing 200 drawings. Consult Firmin-Didot, 'Etude sur Jean Cousin' (1872); Roy, 'Les deux Jehan Cousin' (in Mem. de la Société Archéol. de Sens, Vol. XXIV, 1909); Dimier, 'French Painting in the Sixteenth Century' (1904); id., 'Bulletin de l'art ancien et moderne' (1909).

COUSIN, Victor, French philosopher: b. Paris, 28 Nov. 1792; d. Cannes, 13 Jan. 1867. He founded a school of eclectic philosophy, combining the doctrines of the Scotch school of Reid and Stewart, based on sensation, with those of Schelling and Hegel, which rest on the opposite principle of idealism or intuition. He was not an original thinker but possessed in a high degree the faculty of clear exposition, and for that reason his lectures and his writings enjoyed a great popularity. He rendered a memorable service both to philosophy and literature by his translation of 'Plato' (1840). Besides his 'Fragments philosophiques' (1826) and other works on that theme, he is the author of a few biographical sketches, mostly of characters related to the spiritual and intellectual movements of the 17th century as 'Jacqueline Pascal'; 'Mme. de Longueville'; 'Mme. de Hautefort'; 'French Society in the 17th Century.' As a lecturer and philosophical writer Cousin was distinguished by a rare combination of eloquence, enthusiasm and, as already stated, clearness of exposition. He possessed a beauty of style such as no modern or ancient philosopher excepting Plato has equaled. He rendered a very valuable service to his native land in the part he took in the organization of primary instruction. In 1831, under a commission from the French government, he visited Germany to study educational methods there, and the 'Rapport sur l'Etat de l'Instruction Publique' published on his return had powerful influence on subsequent legislation. Consult Janet, 'Victor Cousin et son Œuvre' (1885); Simon, Jules, 'Victor Cousin' (1887); Taine, 'Les Philosophes Classiques du XIXe Siècle' (1888); Saint-Hilaire, B, 'Victor Cousin, sa vie, sa Correspondence' (1895).

COUSIN MICHEL, mĕ'hĕl, a nickname sometimes applied to a German, as John Bull is to an Englishman, or Brother Jonathan to an American.

COUSINS, Samuel, English engraver: b. Exeter, 9 May 1801; d. 7 May 1887. He was early apprenticed to the mezzotint engraver, S. W. Reynolds. He first brought himself into notice by his engraving of Lawrence's 'Lady Acland and her Children,' in 1826. In 1835 he was elected A.R.A., and in 1855 became the first Royal Academician engraver. These were followed by many portraits and pictures after Revnolds, Lawrence, Gainsborough, J. E. Millais, Wilkie, Landseer and others. Of his numerous works the following may be mentioned: ‘Pope Pius VII’ (1827), after Lawrence; ‘Bolton Abbey in the Olden Time’ (1837), after Landseer; ‘Queen Victoria’ (1838), after Chalon; ‘The Maid and the Magpie’ (1862), after Landseer; ‘Yes or No’ (1873), after Millais; ‘Simplicity’ (1874), after Reynolds; ‘Cherry Ripe’ (1881), and ‘Pomona’ (1882), after Millais. Consult his biography by A. Whitman (London 1904).

COUSTOU, koo'stoo', **Guillaume**, THE ELDER, French sculptor: b. Lyons, 25 April 1678; d. Paris, 20 Feb. 1746. He studied under his father and spent several years in Rome, where he assisted Pierre Legros. Besides work done in collaboration with his brother, he modeled the kneeling statue of Louis XIII in Notre Dame, ‘Ocean and Mediterranean’ and the vigorous and spirited marble groups of the ‘Horses of Marly’ at the entrance to the Champs Elysées. He was a brother of Nicolas Coustou (q.v.) whom he succeeded as director of the Academy of Fine Arts. The monument of the Cardinal Dubois, in the church of Saint Roch, is much esteemed.

COUSTOU, Guillaume, THE YOUNGER, French sculptor: b. Paris 1716; d. there 1777. He was eldest son of the preceding, and on him Joseph II, during his stay in Paris, conferred with his own hands the order of Saint Michael. The statues of Venus and Mars, larger than life, which he made in 1769 for the king of Prussia, gained universal admiration. His monument of the Dauphin and Dauphiness, parents of Louis XVI, in the cathedral of Sens, bears the character of majestic simplicity. Consult Lady Dilke, ‘French Architects and Sculptors of the 18th Century’ (1900); and ‘Les Coustou’ (in *Gazette des Beaux-Arts,* Vol. I, 1901).

COUSTOU, Nicolas, French sculptor: b. Lyons, 9 Jan. 1658; d. Paris, 1 May 1733. He studied with his father, François, a wood carver, and later at Paris. He then spent three years in Rome, and then returned to Paris, where he was appointed rector of the Academy in 1720 and chancellor in 1733. He is admired for his ability in grouping and delicacy of design, although a tendency to an affected refinement, then becoming common, is observable in his works. His works include decorations for the palaces of Versailles, Trianon and Marly, in which he was assisted by his brother, Guillaume; ‘Union of the Seine and the Marne’; ‘Daphne Pursued by Apollo,’ in the Garden of the Tuileries; statues of Julius Cæsar and of Louis XIV in the Louvre, and the ‘Descent from the Cross,’ in the Notre Dame in Paris, which is particularly valued. The younger brother was a worthy disciple of the elder.

COUTHON, koo-tôn, **Georges**, French revolutionist: b. Orcet 1756; d. Paris, 28 July 1794. Immediately previous to the Revolution he had made himself conspicuous as a Liberal in the provincial assembly at Auvergne, and had gained considerable popularity by the gratuitous assistance he offered the poor. Some time after the Revolution he was chosen a member of the National Assembly, where he soon forfeited his character for mildness and amiability, and allying himself with Robespierre, aided and abetted the latter in all his atrocities. He was appointed on the Committee of Public Safety and sent against the insurgent city of Lyons. The lives of the citizens were spared, although property was destroyed. On his return to Paris he established with Robespierre and Saint Just a supreme tribunal. On the downfall of Robespierre's party Couthon shared, along with him and Saint Just, the decree of arrest pronounced by the Convention on 9th Thermidor. The same day he and his compeers were seized in the Hôtel de Ville, where, in the scuffle that ensued, Couthon was nearly trampled to death, but survived sufficiently to be guillotined next day. Consule Mège, ‘Correspondence de Couthon’ (Paris 1872); Aulard, ‘Les orateurs de la législative et de la convention’ (Paris 1885–86); Morse, Stephens, ‘The French Revolution’ (New York 1891).

COUTURE, koo-tür, **Thomas**, French historical and genre painter: b. Senlis, 21 Dec. 1815; d. Villiers-le-Bel, near Paris, 30 March 1879. He studied under Gros and Delaroche; he was a disciple of neither. In 1837 he was awarded the Prix de Rome, and in 1845 his picture ‘The Thirst for Gold’ (Toulouse Museum, replica in Amsterdam) attracted considerable attention. His best picture is ‘Les Romains de la Decadence’ (1847), now in the Louvre, which obtained a first class medal and created a noteworthy sensation. Among other works are ‘Une veuve’; ‘Le trouvère’ (1844); ‘Joconde’ (1847); and ‘The Volunteers of 1793,’ now in the Boston Museum of Fine Arts. Under Napoleon III he became court painter, but not being gallant never gained much popularity. His pictures were purchased mostly by foreigners, especially Americans. He also painted the frescoes in the chapel of the Virgin, Saint-Eustache, Paris, and, during this last period, many portraits of which there are frequent examples in the museums of southern France. His art is rich in color and clear in line. Among his pupils were Fuerbach, Victor Muller, Puvis de Chavannes, Manet and many lesser artists of countries other than France. His book, ‘Conversations on Art Methods,’ was translated by Stewart and published in New York in 1879. Consult Healey, ‘Couture’ in Van Dyck's ‘Modern French Masters’ (New York 1896); Claretie, ‘Peintres et sculpteurs contemporains’ (Paris 1873); Flat, ‘Un peintre assimilateur’ (in *Revue Politique et Littéraire,* Paris 1913).

COUVADE, koo-väd', a curious custom prevalent in ancient as well as modern times among primitive races in all parts of the world. After the birth of a child the father takes to bed, and receives all the delicate food and careful nursing which, among civilized peoples, is given to the mother. This custom was observed, according to Diodorus, among the Corsicans; and Strabo states that it existed among the Iberians. Many travelers from Marco Polo downward have met with similar custom among the Chinese, the Dyaks of Borneo, the negroes and especially among the aboriginal tribes of North and South America. The Indians explain it by saying that descent is directly from the father, while anthropologists suggest that it is a ceremony by which the father proclaims his relation to the new-born child. Tylor at first explained the usage as a symbol of a direct physical bond between the male parent and the child. Thus the father refrained from eating flesh of certain animals for a period before the birth of the child, in the belief that food directly influenced character. The theory which seems most plausible is that the couvade was simply an evidence of the belief in sympathetic magic. Consult Ripley, 'The Races of Europe' (1899); McGee, 'The Seri Indians' (17th Report American Bureau of Ethnology); Tylor, 'Researches into the Early History of Mankind' (pp. 291ff); id., 'On a Method of Investigating the Development of Institutions' (in *Journal of the Anthropological Institute,* Vol. XVIII, pp. 254ff, 1889); Ploss, 'Das Weib' (1897).

COVARIANT. See Invariants.

COVELLITE, a copper ore consisting of the indigo-blue sulphate of that metal, containing 66.4 per cent of copper. It is one of the minor ores in the Anaconda mines, near Butte, Mont., also at Ely, Nev.

COVENANT, *in law,* an agreement between two or more persons, entered into by deed, whereby one of the parties promises the performance or non-performance of certain acts, or that a given state of things does or shall, or does not or shall not, exist. It differs from an express assumpsit in that it must be by deed. *Affirmative* covenants are those in which the covenanter declares that something has already been done, or shall be done in the future. Such covenants do not operate to deprive covenantees of rights enjoyed independently of the covenants. *Auxiliary* covenants are those which do not relate directly to the principal matter of contract between the parties, but to something connected with it. *Collateral* covenants are those which are entered into in connection with the grant of something, but which do not relate immediately to the thing granted. *Concurrent* covenants are those which are to be performed simultaneously. *Declaratory* covenants are those which serve to limit or direct uses. *Dependent* covenants are those in which the obligation to perform by one is made to depend upon the performance by the other. *Covenants for title* are those covenants in a deed conveying land, which are inserted for the purpose of securing to the grantee and covenantee the benefit of the title which the grantor and covenantor professes to convey. A *real* covenant is one which at early common law bound the covenantor's heirs to the extent to which they inherited real estate. They are now of slight importance, and the term is now used in contradistinction to *personal* covenants which do not run with the land. An *inherent* covenant is another name for *real.* When a covenant relates to an act already done, it is called executed; where the performance is future it is called executory. An action of covenant might be instituted for breaking covenant. The doctrine of «warrandice» in Scottish law fills the place of covenant to some extent. Those in common use are five in number in England,— *of seisin, of rights to convey, for quiet enjoyment, against encumbrances* and *for further assurance,*— and are held to run with the land. There is besides in the United States, where most of the classes of covenants are enforced, a *covenant of warranty* which is more commonly used than any of the others. The covenants of seisin, against encumbrances, and right to convey, are generally held to be *in præsenti* and not assignable. Consult Sims, 'Treatise on Covenants' (Chicago 1901); Goodeve, 'Law of Real Property' (5th ed., London 1906); Hamilton, 'Law of Covenant' (London).

COVENANT, a term in theology derived from the Hebrew *bĕrîth,* bond, «fetter,» probably introduced into Canaan during the Babylonian occupation; in Greek, the corresponding word is *διαθήκη,* diathēkē, meaning will, testament. Not all of the old meanings are included in the English word «covenant,» which «applies to a contract between two parties acting freely, while both the Hebrew and the Greek words may be used of anything binding upon the two parties to any transaction, whether the terms are accepted voluntarily or imposed by one of the parties or by another.» In Old Testament history, a covenant was usually an agreement between clans or tribes for the securing of peace and safety; as defining the relation of suzerain to his subjects, the bond between God and his people. Ceremonies such as animal sacrifice attended the making of a covenant. Religion was a covenant with Yahweh, to which the latter was also bound to be faithful. The provisions and sanctions of the covenant are summarized in the laws of Israel. In the course of prophetic history, the covenant became the animating bond of union between Yahweh and his people — the promise of the restoration of the kingdom founded by David is such a covenant. In the New Testament the word is translated by the words «testament» and «covenant.» In the federal theology of Johannes Cocceius, this conception of covenant assumed primary importance. In Scottish history the covenant is the articles of faith of the dissenters. See Covenanters.

COVENANT OF LIBERTY OF WORSHIP, the first Covenant subscribed to in Scotland (3 Dec. 1557) in which the signers petitioned the government for liberty of worship. Two years later a second covenant was signed (31 May) for the «mutual assistance of all the subscribers thereto in defense of their religious rights.» Finally civil war broke out. French troops were invited to Scotland by the Papal party; and the «congregation» called in the aid of Elizabeth of England. The French troops were withdrawn from Scotland in 1560, and the Scottish Parliament, being left at liberty and free from pressure on the part of the royal family and favored nobles, decreed that the Presbyterian should be the Established Church of Scotland. In 1638, all the preceding covenants were summed up in the National Covenant, which was subscribed to all over Scotland. See Lords of the Congregation and also Congregation.

COVENANTERS, in Scottish history, the name given to the party which struggled for religious liberty from 1637 on to the Revolution. They were so called because they bound themselves in a series of covenants to maintain the Presbyterian doctrines. The first oath was signed in the winter of 1557, on the second coming of Knox to Scotland; another signed by King James, and called the King's Covenant, was signed in 1581. It was drawn up by John Craig to offset the growing predominance of

Catholicism, which it denounced. It was again subscribed to in 1590 and 1596.

After the union of the crowns of Scotland and England (1603), as the Stuarts favored the Episcopal churches, whose hierarchical form seemed fitted to promote their despotic views, the dangers which threatened Presbyterianism brought its followers in Scotland to a closer union; and when, in 1637, the new liturgy, modeled after the English, was ordered to be introduced into their churches, disturbances arose, which ended in the forming of a new Covenant the following year. This was called the National Covenant. The subscription of it began in the Grayfriars' Church, Edinburgh, 28 Feb. 1638. Copies were circulated throughout the country for general signature, many of which are still extant. The Covenant, with the confession of faith which it embodied, was ratified by the General Assembly at Glasgow, 21 Nov. 1638, and by the Scottish Parliament in 1640. In 1642 the English Parliament applied to the Scots for aid in the Civil War in the reign of Charles I and the application was pressed more earnestly in the following year. The Covenanters, who were then masters of Scotland, demanded that the English Parliament should take the Covenant, and assimilate the doctrine and discipline of the churches of the two nations. In consequence of this stipulation, 25 Sept. 1643, both Houses of Parliament met at Saint Margaret's Church, Westminster, along with the Assembly of Divines and the Scottish commissioners, to take the Covenant, which had been modified by the Assembly. After prayers and sermons, all present held up their hands in testimony of assent to it; and afterward, in their several Houses, subscribed it on a Parliament roll. The House of Commons ordered it to be taken by all persons in their respective parishes next Lord's Day.

Both covenants were signed by Charles II on his landing in Scotland in 1650, and again at his coronation at Scone, 1 Jan. 1651. The covenanters were now the supreme power in Scotland, but their supremacy was undermined by the victory at Dunbar in 1651, and vanished when Charles was restored in 1660.

In 1661 the Covenant was burned by the hangman, and in 1662 abjured by act of Parliament, in both England and Scotland. Oppressive measures were inaugurated against the Covenanters who, outraged, finally in 1665 took up arms in defense of the Presbyterian form of church government. The Presbyterian ministers who refused to acknowledge the bishops were ejected from their parishes and drew around them crowds of their people on the hillsides, or any lonely spot, to attend their ministrations. These meetings, called «conventicles,» were denounced as seditious, and to frequent them, or to hold communication with those frequenting them, was forbidden on pain of death. The unwarrantable severity with which the recusants were treated provoked them to take up arms in defense of their opinions. The first outbreaks took place in the hill country on the borders of Ayr and Lanark shires. Here at Drumclog, a farm near Loudon Hill, a conventicle was attacked by a body of dragoons under Graham of Claverhouse, but were successful in defeating their assailants (1679). The murder of Archbishop Sharp on Magus Moor, and this defeat, alarmed the government, who sent a large body of troops to put down the insurgents, who had increased in number rapidly. The two armies met at Bothwell Bridge, where the Covenanters were totally defeated (22 June 1679). In consequence of the rebellious protests called the Sanquhar Declaration, put forth in 1680 by Cameron, Cargill and others, as representing the more irreconcilable of the Covenanters (known as Cameronians), and a subsequent proclamation in 1684, the government proceeded to more severe measures. An oath was now required of all who would free themselves of suspicion of complicity with the Covenanters; and the dragoons who were sent out to hunt down the rebels were empowered to kill anyone who refused to take the oath. During this «killing-time,» as it was called, the sufferings of the Covenanters were extreme; but, notwithstanding the great numbers who were put to death, their fanatic spirit seemed only to grow stronger. Even after the accession of William some of the extreme Covenanters refused to acknowledge him owing to his acceptance of episcopacy in England, and these formed the earliest dissenting sect in Scotland. The latest covenant was that drawn up in 1912 by the Scottish Presbyterians of Ulster who were opposed to the Irish Home Rule Bill of Mr. Asquith, on the ground that it might endanger Protestantism. Consult Gardiner, S. B., 'Constitutional Documents of the Puritan Revolution' (London 1897); id., 'History of England' (1883-84); Grub, G., 'Ecclesiastical History of Scotland' (Edinburgh 1861); Macpherson, 'History of the Church of Scotland' (Paisley 1901).

COVENT GARDEN (corrupted from Convent Garden, originally the garden of the Abbot of Westminster), is a spacious square in London, celebrated for a great market of fruit, vegetables and flowers. The square was formed about 1631 from the designs of Inigo Jones, and has the arcade or piazza on the north and northeast side, Tavistock Row on the south, and the church of Saint Paul's on the west. In the 17th century Covent Garden was a very fashionable quarter of the town. The scene of one of Dryden's plays is laid here, and frequent allusions are made to the place in plays of Charles II's time. The market, now so famous, appears to have originated about 1656 in a few wooden sheds and stalls. The first theatre erected here was built in 1733. It was burned in 1808, rebuilt from a design by Smirke, burned in 1856, and since wholly rebuilt. Covent Garden market is for a stranger one of the sights of London, and is seen to greatest advantage about 3 o'clock on a summer morning.

COVENTRY, England, city in the county of Warwick, 85 miles northwest of London, on the Sherbourne. It is one of the oldest cities in England, formerly a walled town. A Benedictine monastery was founded here in 1044 by Earl Leofric and Lady Godiva (q.v.), his wife. Many of the buildings, the cathedral among them, were destroyed by Henry VIII. Parliaments were convened here by the earlier monarchs of England, several of whom occasionally resided in the city. Pageants and processions were popular in the old days, and they still have many admirers. Some of the houses and a few of the narrow and irregular streets of the 15th and 16th centuries are in existence. Coventry has now several fine churches. Its boundaries have been extended because of the expansion of its industries. Its chief manufactures are bicycles, tricycles, ribbons, artificial silk, watches, sewing machines, naval ordnance, motors and fringes. The city owns its own gas, electrical and water plants; it has public baths, an excellent system of sewerage, libraries, a technical school and other public institutions. The city sends one member to Parliament. Pop. 106,377. Consult Dormer, 'History of Coventry' (New York 1898); and Fretton, 'Antiquarian Losses in Coventry,' (in *Archæological Journal*, Vol. XXXVI, London 1880).

COVENTRY, R. I., town in Kent County, situated on the Pawtucket River, 13 miles southwest of Providence, and on the New York, New Haven and Hartford Railroad. The chief industries are the manufacture of cotton and wool and dyeing, bleaching and mercerizing. There is also some agricultural interest. Coventry was taken from Warwick and incorporated in 1871. The town is noted as the home of Gen. Nathanael Greene (q.v.) Pop. 5,848.

COVENTRY PLAYS, The, a series of 42 old plays exhibiting the characteristics of both the old English Morality and Mystery plays. Three complete sets of such dramas have descended to modern times: the 'Chester,' the 'Towneley' and the 'Coventry' mysteries; and from these we derive nearly all our knowledge of the early English drama. Coventry was formerly famous for the performance of its Corpus Christi plays by the Gray Friars. These plays contained the story of the New Testament, composed in Old English rhythm. One manuscript is preserved in the British Museum in the Cotton Library. The earliest record of their performance is in 1392, the latest in 1589. The Coventry plays were published in a volume by the Shakespeare Society in 1841, under such titles as 'The Creation,' 'The Fall of Man,' 'Noah's Flood,' 'The Birth of Christ,' 'Adoration of the Magi,' 'Last Supper,' 'The Pilgrim of Emmaüs,' 'The Resurrection,' 'The Ascension,' 'Doomsday.' Consult Morley, 'English Writers' (Vol. IV, London 1887 et seq.).

COVERDALE, Miles, English bishop and reformer: b. probably at Coverdale, Yorkshire, 1488; d. 19 Feb. 1568. He was educated at Cambridge, entered the convent of the Augustine friars, was ordained a priest at Norwich in 1514, and entered the convent of Austin friars at Cambridge where he fell under the influence of Robert Barnes who became prior about 1523. He also became a friend to Cromwell at this period. He was led some years afterward to embrace and preach the reformed doctrines, and, having gone abroad, is said to have assisted Tyndale in translating the Pentateuch. In 1535 his own translation of the Scriptures appeared, with a dedication to Henry VIII, being the first printed English version of the entire Bible. No name of publisher or place of publication appear on the imperfect copies which now exist. It was probably printed by Nicolson in folio and quarto in 1537, and by Froschouer at Zürich in 1550. It appears possible that Jacob van Meteren was its promoter who engaged Coverdale to do the translation for him. Many of the copies have the preface "out of Douche and Latyn." Coverdale's work occupied a long period of time. In the dedication to Edward VI he says "I was boldened in God 16 years ago to labour faithfully in the same." The basis of the translations are supposed to have been the Vulgate, the Latin of Pagninus, Luther, the Zürich or German-Swiss and Tyndale's Pentateuch and New Testament. The New Testament is based chiefly on Tyndale and is much better than the old. In 1538 he was engaged in superintending at Paris the printing of a revised English version, the greater part of the impression of which was seized and destroyed by the ecclesiastical authorities. The printing presses and types, however, escaped the inquisitors, and being brought over to England, enabled Cranmer's, or the Great Bible, to be printed by Grafton and Whitchurch. The Prayer-book version of the Psalms is from the Great Bible. After the execution of his patron Cromwell (1540), Coverdale went abroad. Having returned in 1548 he was made almoner to Queen Catharine Parr. In 1549 he assisted Whitchurch in the second volume of the 'Paraphrase of Erasmus.' In 1551, during the reign of Edward VI, he was appointed bishop of Exeter, but was ejected on the accession of Mary, and thrown into prison. After two years' confinement he was liberated, and proceeded first to Denmark, and subsequently to Geneva, where he assisted in preparing the Geneva Bible (1560), the favorite Bible of the Puritans. On the accession of Elizabeth he returned to England, but his recently acquired views on ecclesiastical ceremonies prevented his being restored to his see of Exeter. He was, however, made rector of Saint Magnus, London Bridge. In 1563 he obtained the degree of D.D. from the University of Cambridge. The third centenary of the publication of his Bible was celebrated by the clergy throughout the churches of England 4 Oct. 1835. His writings are numerous. Consult 'Memorials of Miles Coverdale' (1838), which contains a bibliography; Fry, 'The Bible by Coverdale' (London 1867); Hoare, 'The Evolution of the English Bible' (ib. 2d ed., 1902); Pollard, 'Records of the English Bible' (Oxford 1911). Biographies are in the Parker Society editions of Coverdale's pieces, an index to which may be found in Gough's 'General Index to the Parker Society.' Consult also 'Dictionary of National Biography' (Vol. XII).

COVERED WAY, in fortification, a space of ground 30 feet broad, on the outer edge of the ditch, above the counterscarp and next the glacis, ranging round the works of a fortification. It affords a safe communication round all the works, facilitates sallies and retreats and the reception of reinforcements, and its parapet protects the fortifications in its rear.

COVERLEY, Sir Roger de. (1) The name given by Addison to a fictitious character whose adventures were related in the 'Spectator'; (2) a Scotch air and dance, known to the Americans as 'The Virginia Reel.'

COVERTURE, kŭv'ėr-tūr, a legal term applied to the position of a woman during marriage because she is under the cover or protection of her husband. See LAW OF HUSBAND AND WIFE.

COVILHAO, kō-vēl-youṅ, Portugal, town in the modern district of Castello Branco, and formerly in the province of Beira, on the southeast slope of the Serra da Estrella, some 25 miles southwest of Guarda. In the neighborhood there are noted sulphurous baths. The town contains dyeworks and important cloth factories. Pop. about 16,000.

COVILLE, Frederick Vernon, American botanist: b. Preston, N. Y., 23 March 1867. He was educated at Cornell University and was instructor in botany there 1887–88, and assistant botanist in the United States Department of Agriculture 1888–93. Since the last named year he has been chief botanist of that department, as well as curator of the United States National Herbarium. He has published 'Botany of the Death Valley Expedition'; 'Our Public Grazing Lands'; 'Experiments in Blueberry Culture'; 'The Formation of Leafmold' and many other papers relating to systematic, geographic and economic botany.

COVINGTON, Ga., city and county-seat of Newton County, 40 miles east of Atlanta, on the Georgia and the Central of Georgia railroads. It is the seat of Emory College (Methodist) and has a public library, courthouse, etc. Its cotton interests are extensive and it has also cotton and oil mills, ice plant, fertilizer works and marble yards. The city owns the electric plant and the waterworks. Pop. 2,697.

COVINGTON, Ind., the county-seat of Fountain County, situated in the northwestern part of the State, on the Wabash River, the Wabash and Erie Canal, and the Cleveland, Cincinnati, Chicago and Saint Louis and the Wabash railroads, 72 miles northwest of Indianapolis. It exports live stock and agricultural produce, and has several iron foundries. There is a canning factory, and the city has a Carnegie library and municipal waterworks and electric-light plant. Pop. 2,069.

COVINGTON, Ky., city and county-seat of Kenton County, on the Ohio River opposite Cincinnati, with which it is connected by a handsome suspension bridge, 2,250 feet long, and costing $2,000,000. It is the northern terminus of the Kentucky Central Railroad and is also on the Louisville, Cincinnati and Lexington Railroad. It is a residence town for Cincinnati business men and is the see of a Roman Catholic bishop. Covington occupies an area of about 5¼ square miles on a beautiful plain partly surrounded by hills and resembles Cincinnati in its general arrangement. The city has many fine residences, a public library, city hall, race track, and a Federal building noteworthy as a specimen of modern Gothic; and among charitable institutions, a hospital for contagious diseases, Catholic and Protestant orphan asylums and a home for aged women. Covington is an important centre of Roman Catholic influence, the cathedral, a type of flamboyant Gothic, being one of the finest ecclesiastical structures in the State. Connected with this denomination there are also a Benedictine priory, a convent, a hospital, foundling asylum, Notre Dame Academy and La Sallette Academy. The facilities for transportation, both by rail and water, placing the city in communication with a wide territory possessing valuable natural advantages, have contributed to the city's commercial importance. Its industrial interests are also important and include extensive pork-packing establishments, distilleries, breweries, cotton factory, ironworks and manufactures of vinegar, furniture, stoves, tinware, bricks, tile, pottery, rope, contractors' machinery, metal signs, automobile trucks, X-ray machines, circus tents, pianos, cordage, etc. The United States census of manufactures for 1914 reported in the city 161 industrial establishments of factory grade, employing 3,736 persons, of whom 3,199 were wage earners, receiving annually a total of $1,815,000 in wages. The capital invested aggregated $7,778,000, and the year's output was valued at $8,205,000: of this, $5,475,000 was the value added by manufacture. Covington has adopted the commission form of government. There are municipal waterworks, built in 1887, furnishing an abundant supply of water drawn from the Ohio River at a distance of about 13 miles above the city. Its annual budget approximates $660,000, the main items of expense being $108,000 for schools, $111,000 for interest on debt, $47,000 for police department, $35,000 for fire department, $55,000 for street expenditures and $15,000 for public library fund. Settled in 1812 and laid out three years later, Covington was chartered as a city in 1834. Pop. 56,000.

COVINGTON, Tenn., county-seat of Tipton County, 37 miles northeast of Memphis, on the Illinois Central Railroad. It has an export trade in the agricultural products of the surrounding region, and has cotton-mills, a cotton compress and saw-mills. It is a shipping point for cotton and oil. The waterworks and electric-light plant are owned by the city. Pop. 2,990.

COVODE, John, American congressman: b. Westmoreland County, Pa., 17 March 1808; d. 11 Jan. 1871. He was a farmer's lad of Dutch blood, and became a coal dealer, a woolen manufacturer and a railroad owner. He entered public life as a Whig, served two terms in the legislature, was sent to Congress in 1854 by the Anti-Masons (see ANTI-MASONRY), and re-elected 1856 as a Republican, serving by regular re-elections till 1863. In 1859 he was appointed chairman of the special committee to investigate President Buchanan's conduct in forcing through the Lecompton Bill (see title below, and LECOMPTON CONSTITUTION), and his report was valuable ammunition for the Republican party. He was a member of the committee on the conduct of the war. After Johnson's accession he was sent South to aid in that President's reconstruction policy, but was recalled for lack of sympathy with it. In 1868 he was again elected to Congress, and was a strong opponent of Johnson. In 1869 he was chairman of the Republican State Committee of Pennsylvania. He was an eager, impulsive man, with the friendships and the enmities natural to such a temperament, but respected for his entire honesty. See COVODE INVESTIGATION.

COVODE INVESTIGATION, 1860. President Buchanan, in the struggle to have Congress validate the Lecompton constitution (q.v.), was urged by the party organs to save the unity of the Democratic party, which was menaced with irremediable division, by using the patronage at his disposal to bring the hesitating members into the ranks. In the debates at the opening of the 36th Congress 1859–60, two anti-Lecompton Democrats alleged that he had attempted to use corrupt influence with them. On 5 March 1860 John Covode (q.v.) moved the appointment of a committee to inquire whether the President or any other official had attempted, by money, patronage or other improper means, to influence legislation or the execution of the laws, etc. In spite of Democratic objection that only insinuations and no specific charges were made, the rules were suspended by 117 to 45, and the resolution adopted; an investigating committee of five was appointed, with Covode at the head. Buchanan sent in a message of protest 28 March, objecting on the ground that the President could only be indicted by impeachment, and that this was an indictment; and that such a method was inconsistent with the dignity of the office. The protest was declared unfounded by 88 to 40. On 16 June the committee reported, the Republican members declaring that the mass of evidence collected was proof of corrupt use of patronage, and Covode later alleged that they found also direct bribery, as evidenced by bank-books. The Democratic members declared the allegations unsupported. No action was recommended to the House by the majority report, and none was taken. On 22 June Buchanan sent a second message protesting against the rejection of his first, and saying that on such views no man of honor and principle could accept the presidency. The House appointed another committee to report on this at the next session. Consult 'Report of the Committee' (Washington 1860); Buchanan's 'Autobiography,' with his defense; Curtis, 'Life of Buchanan' (1883), for another defense.

COW, the female of bovine animals, of which the male is called an ox (q.v.) or a bull. By a familiar process of extension the term has been applied to various other large herbivorous animals, such as the elephant, and even to female seals and whales.

COWAGE. See Cowitch.

COWBANE, or WATER-HEMLOCK (*Cicuta virosa*), a perennial, umbelliferous, aquatic plant, producing an erect, hollow, much-branched, striated stem three or four feet high, furnished with dissected leaves. It is highly poisonous, containing cicutine, an alkaloid resembling conia (q.v.), *C. maculata* is the spotted cowbane of the United States.

COWBERRY, a name sometimes used for the single species (*C. palustre*) of the genus *Comarum*, of the rose family (*Rosaceæ*). It is known also as marsh cinquefoil and purple marshlocks. It is a stout green herb with large and showy purple flowers. It grows in swamps and peat-bogs from Labrador to New Jersey, Alaska and California. It is also indigenous in Europe and Asia. It received the name of cowberry because it was thought, when rubbed on the milk-pan, to thicken the milk. The name is also applied to the cranberry (q.v.).

COWBIRD, a bird (*Molothrus ater*) of the family *Icteridæ* (q.v.), abundant throughout North America except in the far north, and notorious because of its habit of escaping the drudgery of domestic cares after the fashion of the European cuckoo. Closely related to the bobolink or reed-bird, the cowbird lacks the acute tail feathers and rich spring plumage of that species, while its general build, and particularly its stout beak, are even more finch-like. The male is from seven and a half to eight inches long and iridescent black with a brown head and the female slightly smaller and nearly uniform dull brown. The cowbird takes its name from the habit of associating in flocks with cattle in the fields, apparently for the purpose of securing the flies which frequent the cattle or the other insects which are disturbed by their movements. They are migratory and gregarious, never separating in pairs, but apparently quite promiscuous in their sexual relations. Nests are never built, but, like the European cuckoo, the eggs are stealthily introduced into the nests of other birds, preferably those of smaller size, such as warblers, finches and vireos, of which a great many species are victimized. Apparently the cowbird exercises little choice, but drops its eggs into any suitable nest that happens to be convenient; and, owing to its abundance, an astonishingly large number of nests are thus invaded. Some of the smaller warblers, notably the yellow warbler (*Dendroica æstiva*) and the redstart (*Setophaga ruticilla*), endeavor to circumvent the intruder by building a second story to the nest, enclosing between the two floors the egg of the cowbird and even sacrificing one or more of their own. Nests with three cowbird's eggs thus enclosed in as many compartments have been found. Although but a single egg is deposited at a time, as many as three or four will sometimes be found in a single nest, in which cases they have probably been dropped by different females. The alien eggs, which are white or grayish and speckled with brown, and are about .84 by .65 of an inch, hatch before those rightfully belonging to the nest, and, once the young cowbird has hatched, its demands for food so claim the attention of its foster-parents that the latter's own eggs or young are neglected and usually perish. Although chiefly insectivorous, berries and seeds are sometimes eaten by the cowbird.

In the warm parts of America a number of related species occur, which, having similar habits, are also known as cowbirds. A most remarkable relation exists between two South American species.

Molothrus badius, one of those in question, has the unusual habit of seizing and utilizing for the purpose of incubating its own eggs the nests of weaker birds, whose eggs are destroyed. The second species (*M. rufoaxillaris*) is regularly and perhaps exclusively parasitic on the former. Consult Bendire, 'The Cowbirds,' (in *Report of the National Museum for* 1893, Washington 1895).

COWBOYS, in the American Revolution, a band of American Tories who infested the neutral ground of Westchester County, N. Y., robbed the Whigs and Loyalists and made a specialty of stealing cattle. A similar band of marauders on the British side received the name of "Skinners." The word cowboys is now used to designate the men who have charge of the cattle on the vast ranges in the west and southwest of the United States. They are well mounted and usually wear a fanciful costume. They are bold and adventurous and necessarily have to encounter many dangers. A number of them were enlisted in two regiments of cavalry for the war with Spain, and, under the popular name of «Rough Riders,» greatly distinguished themselves in the early part of the campaign against Santiago, in Cuba.

COW-PARSNIP, or **GIANT PARSLEY,** popular names for several species of the genus *Heracleum* of the family *Apiaceæ*. They are coarse perennial herbs three to six feet tall, with large attractive leaves, for which the plants are valued in ornamental gardening, especially close to water and in wet soil. They should not be allowed to produce seed, because they are likely to become troublesome as weeds. Several of the species, of which there are about 60 widely distributed in temperate climates, are used as stock-feed, particularly in Europe, and have been suggested as desirable to plant for this purpose, because they produce an abundance of leaves very early in the spring. *H. panaces* is usually so recommended. It often attains heights exceeding eight feet and bears numerous leaves two or more feet long. One species, *H. lanatum,* is widely distributed in North America and furnishes edible stems which in Alaska are called wild celery.

COW-PILOT, (*pomacentrus saxatilis*), a small fish, so called in Bermuda because it is believed always to accompany the cowfish (*ostracium*). It is one of the demoiselles and is also called «mojarra.»

COW-PLANT, a perennial plant of the family *Asclepiadaceæ,* milkweed family, which has acquired a celebrity from the repeated statement that its juice is used as milk and that its leaves are boiled to supply the want of cream. This arises from the appearance of the juice, which is white and viscid and contains the poisonous principles characteristic of the milkweed family. In parts of the United States cow-plant is a common name for *Rhododendron maximum.*

COW-TREE, a name given to a number of trees of different families, the milky juice of which is used as a substitute for milk. A large tree (*Brosimum galactodendron*) belonging to the family *Moraceæ.* emits, when pierced, a highly nutritious milky juice with an agreeable creamy odor and taste recalling that of cow's milk, but which is slightly viscid and soon becomes yellow, gradually thickening into a somewhat cheesy consistency. It grows on the Cordilleras of the coast of Venezuela, where it is called *palo de vaca,* or *árbol de leche.* The negroes and other lean natives of the region fatten on its milk. The cow-tree or hya-hya of Demerara is *Tabernæmontana utilis,* a tree belonging to the *Asclepiadaceæ.* In this family the milky juice is usually acrid and poisonous and even that of the other species of the same genus is of a sharp and burning taste. In this case, however, the juice is agreeable and wholesome, although somewhat sticky, owing to the large proportion of caoutchouc.

COW-WHEAT, the common name for the hemiparasitic scrophulariaceous genus *Melampyrum,* of which there are several species.

COWELL, Edward Byles, English Sanskrit scholar: b. Ipswich, Suffolk, 23 Jan. 1826; d. Cambridge, 9 Feb. 1903. He was educated at Oxford and was for some years principal of the Sanskrit College, Calcutta. Since 1867 he was professor of Sanskrit in Cambridge University and was ranked as the foremost English Orientalist of his day. His association with Edward Fitz Gerald of Omar Khayyam fame makes him an important figure in English literary history. He published 'The Prâkrit Grammar of Vararuci in Sanskrit and English' (1854); 'The Black Yajur Veda' (Books 1–2 with Roer, 1856–64); 'The Kaushitaki Upanishad, in Sanskrit and English' (1861); 'The Maitri Upanisad, in Sanskrit and English' (1863); 'The Kusumâñjali, or Hindu Proof of the Existence of a Supreme Being, in Sanskrit and English' (1864); 'The Aphorisms of Sândilya' (translated from the Sanskrit, 1878); 'The Sarva-Darsána-Samgrahá,' translated from the Sanskrit (with Gough, 1882); 'The Divyâvandna' (with Neil, 1886); 'The Buddha-caritá,' by Asvagosha in Sanskrit and English, 1892–94). He left unfinished the translations of 'The Jâtâka; or Stories of Buddha's Former Births' (7 vols., 1895–1913), of which the sixth volume was published in 1907, translated by him in conjunction with Rouse. His 'Life and Letters' were edited by George Cowell, his kinsman (Oxford 1904).

COWEN, Sir Frederic Hymen, English musical composer and conductor: b. Kingston, Jamaica, 29 Jan. 1852. He was brought to England when very young, and studied music under Sir Julius Benedict and Sir John Goss. His cantata, 'The Rose Maiden,' produced in 1870, was followed in 1876 by another, 'The Corsair,' and 'Pauline,' an opera. His other works include 'Saint Ursula' (1881), a cantata; 'The Sleeping Beauty' (1885), also a cantata; 'Ruth (1887), an oratorio; 'Song of Thanksgiving' (1888); 'St. John's Eve' (1889), a cantata; 'Thorgrim' (1890), an opera; 'The Water Lily' (1893), a cantata; 'Signa' (1892), an opera; 'Harold' (1895), an opera; 'The Transfiguration' (1895), a cantata; 'The Dream of Endymion' (1897); 'Ode to the Passions' (1898); 'Coronation Ode' (1902); 'John Gilpin,' a cantata (1904); 'The Veil' (1910). He has also composed six symphonies, the chief being No. 3 (the Scandinavian), No. 4 (the Welsh), and No. 6 (the Idyllic). Overtures, dances, suites, songs and duets, pianoforte pieces, etc., make up the rest of his musical productions. In 1888 he conducted the concerts at the Melbourne Centennial Exhibition, and from 1888 till 1892 was conductor of the Philharmonic Society, and was re-elected in 1900. In 1896 he succeeded Sir Charles Hallé as conductor of the Manchester concerts, Liverpool Philharmonic Society, Bradford Festival Choral Society, etc. He was knighted in 1911, and has published his reminiscences, 'My Art and My Friends' (1913).

COWES, kowz, **West,** England, seaport in Hampshire, on the north coast of the Isle of Wight, at the mouth of the river Medina. It is divided into East and West Cowes, a steam ferry across the river furnishing connection. The public buildings include the castle, an old block fort of the time of Henry VIII, now used by the Royal Yacht Squadron as their club-house and the Royal London Yacht branch club-house. Cowes is now principally known as a yachting port, and is considered the best place for building, fitting out and laying up that class of vessels. Besides the building and repairing of yachts and other vessels, the industries include sail and rope making, etc. Cowes is the customs port for the Isle of Wight. The harbor, though small, is well sheltered and perfectly safe. There is good steamer service to Portsmouth and Southampton. The yachting season commences about the middle of May and extends to the beginning of November. Regattas are held annually. Cowes is much resorted to as a bathing place. Pop. 9,635.

COWHAGE. See Cowitch.

COWITCH, COWAGE, or **COWHAGE,** a plant (*Stisolobium pruriens*) belonging to the pea family (*Papilionaceæ*). It is a twining annual with large racemes of dark-colored flowers, which in India appear in the rainy season. The food, shaped like the letter S, is covered with delicate bristle-like spines, which are easily detached and, sticking in the skin, produce an intolerable itching. In India these spines are mixed with syrup and used as a vermifuge, the spines acting mechanically. When young the pods are cooked and eaten like string-beans. A plant of the same genus, growing in the West Indies, has the same characteristics. The negroes of the Southern States apply the name cowitch to the poison ivy (*Rhus toxicodendron*).

COWL (Sax. *cugle;* Lat. *cucullus*). See Costumes, Ecclesiastical.

COWLES, Alfred Abernethy, American manufacturer: b. Torrington, Conn., 28 Sept. 1845; d. 8 Dec. 1916. He was educated at Middletown, Conn., and at Paris, France; became president of the Ansonia Clock Company; the Coronet Phosphate Company; Terraceia Estates, Inc.; and vice-president of the American Brass Company. He was also president of the Ansonia Brass and Copper Company; the Ansonia Land and Water Power Company; the Birmingham Water Power Company; the Pebbledale Phosphate Company. He was author of the article «Copper and Brass» (in 'One Hundred Years of American Commerce,' edited by C. M. Depew); «Copper and Brass Industry» (in the 'Encyclopedia Americana'); and 'Semitones,' a book of poems (1907).

COWLES, William Lyman, American educator: b. Belchertown, Mass., 1856. He was educated at Amherst College, where he was instructor in Latin, 1880–83. Since 1894 he has been full professor of Latin there. In the study of classical archæology he traveled extensively throughout the Italian Peninsula. His publications include, besides articles for periodicals, an annotated edition of the 'Adelphæ of Terence' (1896); 'Selections from Catullus' (1900); and 'Selections from Ennius, Catullus, Tibullus, and Propertius, with Parallel Passages from Horace, Ovid, and Martial' (1909).

COWLEY, Abraham, English poet: b. London 1618; d. Chertsey, Surrey, 28 July 1667. He so early imbibed a taste for poetry that in 1633, while yet at school, he published a collection of verses, entitled 'Poetical Blossoms.' In 1637 he was elected a scholar of Trinity College, Cambridge, where he soon obtained great literary distinction, and published in 1638 a pastoral comedy, entitled 'Love's Riddle,' and another in Latin, called 'Naufragium Joculare,' acted before the university by the members of Trinity College. He was ejected from Cambridge as a Royalist and removed to Saint John's College, Oxford, where he published a satirical poem entitled the 'Puritan and the Papist.' He engaged actively in the royal cause, and when the queen was obliged to quit England Cowley accompanied her. In 1656 he returned to England, where he now published an edition of his poems, containing 'Miscellanies,' 'The Mistress,' 'Pindarique Odes,' and the never-finished epic, 'Davideis' (on the history of King David). He again visited France, and resumed his functions of agent in the royal cause on the death of Cromwell. On the Restoration he returned with the other Royalists. By the interest of the Duke of Buckingham and the Earl of Saint Albans he obtained the lease of a farm at Chertsey whither he retired in 1665. In 1660 Cowley took part in founding the Royal Society; in 1661 he published a 'Proposition for the Advancement of Experimental Philosophy;' and a 'Discourse by Way of Vision Concerning the Government of Oliver Cromwell,' which is pronounced by Bishop Hurd one of the best of the author's prose works. He published two books of a Latin poem on plants in 1662; he afterward added four more books, and the whole, together with other pieces, was published in 1678 under the title of 'Poemata Latina.' A poem on the 'Civil War' appeared in 1679; his 'Select Works,' with preface and notes by Bishop Hurd, were published in 1772–77. Cowley was extremely popular in his day, and his style, both in prose and verse, has been highly commended by critics; but his poems have failed to maintain their ancient popularity. The wit for which they were once celebrated has become obsolete, and he is now little read; but Charles Lamb speaks highly of him as a poet, and Hazlitt as a prose writer. Good modern editions are 'Complete Works' (ed. Grosart, London 1880–81); 'Poems' (ed. A. R. Waller, Cambridge 1905); 'Essays, Plays, etc.' (Waller, ib. 1906). Consult Johnson, 'Lives of the Poets.'

COWPEA (*Vigna sinensis*). It belongs to the natural order *Leguminoseæ,* family *Fabaceæ,* and is native of southeastern Asia, the Malay Archipelago and central Africa. It is closely related to the asparagus bean and the catjang, the other cultivated species of the genus. It was introduced into the United States in the 18th century, and is most largely grown in the southern States, where it is known as the cornfield or black-eye pea. Its habits of growth vary from a bush type in the northern States to a vine where it has a longer period of growth. Numerous varieties are on the market. Whippoorwill, Black, Clay, and Unknown are favorites. They are often grown on poor soils, but such should be enriched either with barnyard manure or phosphatic fertilizers. The seed is sown broadcast or drilled, at the rate of from one-half to one and a half bushels per acre.

Uses and Feeding Value.— It is grown for food, hay, silage, soiling, grazing and soil renovation, having marked powers of enriching the soil in nitrogen like clover (q.v.). Its average percentage composition is:

	Protein	Nitrogen-free extract	Ether extract	Crude fibre	Ash	Water
Cowpea green........	2.4	7.1	0.4	4.8	1.7	83.6
Cowpea vine silage...	2.7	7.6	1.5	6.0	2.9	79.3
Cowpea hay.........	16.6	42.2	2.2	20.1	7.5	10.7
Cowpea seed.........	20.8	55.7	1.4	4.1	3.2	14.8

The average digestibility per cent is:

	Protein	Nitrogen-free extract	Ether extract	Crude fibre	Dry matter
Cowpea green.............	74	84	59	57	76
Cowpea vine silage.........	57	72	63	52	60
Cowpea hay...............	65	71	50	43	59

Cowpea seeds are eaten by man, either green, shelled and cooked like garden peas or shell-beans, or dried for winter use. They are often fed to stock. Some find difficulty in curing cowpea hay satisfactorily, but this is overcome with experience. The silage is somewhat similar to the green crop in composition. When used for soiling the amount consumed and time of feeding can be regulated, thus avoiding bloating, which is liable to occur when pasturing. Sheep are usually turned on the pasture before the plants are in bloom, cattle about the time the plants come into bloom; while for swine, the peas are allowed to reach full size. An acre will pasture 15 or 20 pigs for several weeks. The manure more than compensates for the vines eaten. Turkeys and chickens eat the ripe peas and do well on them. The plants are sometimes cut down by the cowpea wilt. The September brood of the boll-worm and the weevil (*Bruchis sinensis*) also give trouble to the plants. Consult Smith, 'Cowpeas;' Farmers' Bulletin No. 89; Farmers' Bulletin No. 318; United States Department of Agriculture and Bureau of Plant Industry, Bulletin No. 229.

COWPENS, S. C., post village in Spartanburg County, near the border of North Carolina, with a population of about 1,100. Near here a signal victory was gained by American forces commanded by Gen. Daniel Morgan, over a British division under Colonel Tarleton, 17 Jan. 1781. This engagement is sometimes called the "Bennington of the South," for its decisiveness. See COWPENS, BATTLE OF.

COWPENS, Battle of, in the American Revolution, 17 Jan. 1781. At the end of 1780 Cornwallis held South Carolina with a little over 3,000 men, having lost 1,100 with Ferguson two months before, at King's Mountain. Waiting for reinforcements, he lay at Winnsborough, north of the centre, within supporting distance of Fort Motte and Orangeburg in the centre, Charleston and Georgetown on the coast, and Augusta and Ninety-Six in the west. In December Greene came down with only 2,000 men, but with a wonderful group of subordinate leaders fit for separate commands. With 1,100 men he occupied Cheraw Hill in the northeast, and kept Cornwallis in alarm for his communications with the coast; 900 under Daniel Morgan, part militia, part regulars, he sent to join hands with the victors of King's Mountain if possible, and alarm Cornwallis for the western posts. Cornwallis moved north into North Carolina to force a like movement on Greene, and sent Tarleton after Morgan. The latter took post in a pasture ground called the Cowpens, near the northern boundary, a few miles southwest of King's Mountain, and just west of Broad River. A long slope led up to a low rise; then came a depression, succeeded 150 yards farther on by another rise; and in rear of this was the river, cutting off retreat. This move of Morgan's was in violation of all military rules, but he was a man of genius and used to militia; he said that he could ask but one thing better, and that was to have them entirely surrounded by the enemy, so they could not run — the river was cheaper than regulars to shoot them down. Tarleton came in sight on the morning of 17 Jan. 1781, and Morgan placed his militia 150 yards in front of the first hill, with injunctions to fire at least two volleys at close range before breaking; on the hill, the famous First Maryland regulars, with some fine Virginians; on the second hill, his cavalry under Col. William Washington, a second cousin of George. As the British closed, the militia did not break; they were under Col. Andrew Pickens, and fired many more than the two volleys, with destructive effect. Finally forced back, they retired to the left around the hills to the river bank, in rear of the cavalry, to re-form. The British left stretched around to flank the right of the American regulars, who drew back to face them; the British thought them retreating, and hurried forward in some disorder. Just then Colonel Washington's cavalry charged around the two hills to the left, coming up to the militia's old position and taking the British in rear, with the river on their flank; the militia rushed around the hills to the right, taking them in flank on the left; and the Continental regulars, only 30 yards off, poured in a withering fire and charged bayonet. Hannibal himself never wrought out a finer piece of tactics, or caught an enemy in a deadlier trap. Most of the British troops threw down their arms; the remnant fled with Tarleton, who barely escaped being cut down by Colonel Washington's sabre. Of the 1,100, 270 were killed and wounded, and 600 taken prisoners, with two field-pieces and 1,000 small arms. The Americans lost 12 killed and 62 wounded. Nearly a third of Cornwallis' army, including all his light troops, were annihilated at a blow.

COWPER, William, English poet: b. Great Berkhampstead, Hertfordshire, 26 Nov. 1731; d. East Dereham, Norfolk, 25 April 1800. The eldest surviving child of the Rev. John Cowper (pronounced Cooper) and Anne Donne (d. 1737), he was well connected on both sides, but inherited weakness of mind and body, and was unfortunate in the influences that surrounded his childhood. At 10 he entered Westminster School. Here he formed friendships with bright youths like the future poet, Robert Lloyd, Warren Hastings, Impey, Churchill and Colmar and showed fondness for athletics and literary studies; but he also displayed some morbidity, particularly in religious matters. After eight years at Westminster, and a few months at home, he was articled for three years to a London solicitor. Later he described these and the following 12 years as "misspent," meaning that he thought little about the state of his soul and enjoyed visiting the three attractive daughters of his uncle, Ashley Cowper. In 1752 he took chambers in the Middle Temple. He was called to the bar in 1754, but made few efforts to secure clients, his conduct being partly explained by the fact that in 1753 he was afflicted with a sort of mental dejection that for many months paralyzed his energies. Finally, after he had received consolation from George Herbert's poetry and had had his "hard heart" softened by prayer, a visit to the seashore completed a temporary cure.

In 1756 his father died; the same year his suit for the hand of his cousin, Theodora Cowper, was rejected by his uncle. She remained true to him, and shortly after her death the love poems he wrote her were published (1825). Cowper does not appear to have been inconsolable. There is evidence of a shadowy love affair in 1758, and he had previously been attending the weekly dinners of the "Nonsense Club," with Lloyd and other old schoolmates, and had done some translating and written a few essays for periodicals. In 1759 he bought a suite of chambers in the Inner Temple and was made a commissioner of bankrupts; but he spent more than his income. In his pecuniary stress he obtained from his cousin, Major Cowper, the gift of the patent office of clerk of the journals of the House of Lords. But his kinsman's right to bestow the post being questioned, it was decided that Cowper's fitness must be tested by an examination. He broke down in his preparation for this, and, as the ordeal drew near, he grew more and more despondent. Finally he made four vain attempts to commit suicide (November 1763). The idea of his securing the office had to be abandoned, and a few weeks later he was placed in the private asylum kept at Saint Albans by the poet-physician, Dr. Nathaniel Cotton.

After about five months he began to mend, and arguments with his younger brother, the Rev. John Cowper, tended to dispel the belief that he had committed the unpardonable sin. He continued at the asylum, however, until June 1765, when he removed to Huntingdon, resolving to break away forever from his former life. He became practically a recluse, but he had already acquired the urbanity which was to be so marked a characteristic of his poetry and his correspondence.

In Huntingdon Cowper began his famous friendship with the family of the Rev. Mr. Unwin, particularly with the latter's pious wife (Mary Cawthorne) and his son, later the Rev. William Cawthorne Unwin. They soon took Cowper as a boarder, and at last his religious aspirations were apparently in a fair way of being satisfied. Every day was spent in attending church twice, in singing hymns and praying, and in reading and conversing on evangelical topics. Withal, the friends seem to have been cheerful, not outwardly morbid.

In the summer of 1767 the elder Unwin fell from his horse and died in consequence. Then John Newton (q.v.), curate of Olney, persuaded Mrs. Unwin and Cowper to remove to that town, which has since been associated with the poet's memory. They took a house called "Orchard Side," and Cowper found congenial employment in assisting Newton in his work among the poor and in writing hymns. In 1770, on the death of his brother John, Cowper wrote 'Adelphi,' an account of that clergyman's conversion to evangelical tenets (published 1802). Two years later he and Mrs. Unwin became engaged, but all thoughts of marriage were soon dispelled by Cowper's third derangement, which began in January 1773, and lasted until May 1774. After a terrible dream in February 1773, he seems never to have been able to believe for long that there was any hope of his salvation. Yet, when he had outwardly recovered, he strove manfully not to exert a depressing influence on others, and he took much innocent pleasure in taming hares, keeping a garden, building his summer-house, and describing to correspondents such local events as the Olney fire of 1777. In 1799 Newton published the 'Olney Hymns,' of which 68, including 'Oh for a Closer Walk with God' and 'God Moves in a Mysterious Way,' were by Cowper. Later in the same year Newton accepted a rectory in London. Whether his intense nature had oppressed Cowper's mild genius is a moot point. It is at least certain that the latter's literary career really commenced after his friend Newton left Olney.

Under the encouragement of Mrs. Unwin, Cowper began to write steadily upon a series of didactic, semi-satiric poems — 'Progress of Error,' 'Truth,' 'Table Talk,' and 'Expostulation' (December 1780–February 1781). Newton acted as a friendly critic and secured a publisher for the volume, which, with the addition of 'Hope,' 'Charity,' 'Conversation,' and 'Retirement,' and some shorter pieces, including translations of the Latin poems of Cowper's old schoolmaster at Westminster, Vincent Bourne, finally appeared in February 1782, and was moderately successful. Time has shown, not only that it contained many apt passages of observation and reflection, but that it heralded a departure, not too violent, from the over-polished style and somewhat metallic versification of Pope.

Meanwhile, the poet had made the acquaintance of a baronet's widow, Lady Austen, who was visiting near Olney. The intimacy, which Mrs. Unwin shared, became too intense to last more than a couple of years; but, whatever Lady Austen's disappointments, we owe to it two of Cowper's best poems — the humorous ballad of 'John Gilpin' (November 1782), based on a story she told Cowper to dispel his melancholy, and 'The Task,' his great discursive poem in blank verse, which, beginning with Lady Austen's theme, the sofa, broadened out into reflections upon life and descriptions of nature unrivaled in their day and in respect to realistic fidelity and homely charm not clearly surpassed since. 'The Task' was probably begun in July 1783, and was finally published in June 1785, along with 'John Gilpin' (which had already been circulated in periodicals), the admirable 'Epistle to Joseph Hill,' and 'Tirocinium,' a satire upon current education (1782–84). Cowper had meanwhile begun his translation of the Iliad in blank verse and had written some of his shorter poems, e.g., 'The

Poplar Field.' All this time, with the exception of three days in May 1785, he believed firmly that God had given him over, and that it was his duty not to pray, since that would imply a questioning of the righteousness of the divine decree.

'The Task,' helped by the vogue of 'John Gilpin,' attained success. Cowper became the chief poet of the day, and secured a popularity which lasted well into the next century. His relatives began to pay more attention to him, and in Lady Hesketh, sister of his sweetheart Theodora, and the Rev. John Johnson, of Norfolk, he found supporters during the trying years that were in store for him. His income was increased, and with Lady Hesketh's aid he and Mrs. Unwin removed from Olney to the neighboring Weston in November 1786. Shortly afterward they were shocked by William Unwin's sudden death. Then Cowper suffered his fourth derangement, which lasted from January to June 1787. He recovered rather speedily and worked away at Homer, wrote excellent short poems, and resumed his correspondence, but was all the while subject to hallucinations and melancholia. In September 1788, he began translating the Odyssey, and the complete Homer, including the 'Batrachomyomachia,' was published by subscription in July 1791, with a success which time has not ratified. Posterity much prefers the pathetic lines 'On the Receipt of My Mother's Picture out of Norfolk,' written in the spring of 1790. After the Homer Cowper, having been assured by a demented schoolmaster-friend named Teedon that heaven was willing, undertook to edit an elaborate edition of his favorite, Milton. The scheme came to little, but it was the occasion of his forming a warm friendship with his future biographer, William Hayley, to whom he paid a visit in August 1792, accompanied by Mrs. Unwin, who had been partly incapacitated by paralysis. Then Mrs. Unwin's health sank steadily, and Cowper, in a sad state himself, became in his turn the indefatigable nurse. The lines 'My Mary' commemorate the melancholy situation. In January 1794, Cowper himself was seized with his old complaint and sank into a stupor, from which he practically never rallied. He did not appreciate the fact that he had been granted a pension of £300 by the government. Mrs. Unwin also grew worse, and but for the ministrations of Lady Hesketh, Hayley and John Johnson, the last six years of Cowper's life would be a stretch of unrelieved gloom. In July 1795, Johnson removed the two invalids to Norfolk. They settled finally at East Dereham, where on 17 Dec. 1796, Mrs. Unwin died, the event scarcely producing an emotion in the man who loved her. Cowper continued in his state of dejection, though he could still work at the revision of his Homer. His only important original composition during the period was the poignantly pathetic 'Castaway,' written 20 March 1799. He still persisted in believing that God had forsaken him, and in this dreadful belief he died on 25 April 1800. He was buried in East Dereham Church beside Mrs. Unwin.

Cowper's importance as a precursor of Wordsworth, and the positive excellence of many of his descriptive and satiric passages and of his humorous and pathetic shorter poems are generally acknowledged. He is a classic, and, if his range of work were sufficiently taken into account — his heroic odes, his familiar verse, his humorous ballads, his poems of domestic affection, his verses on animals (in which he is almost unrivaled), his reflective lyrics, his satires and his faithful descriptions of quiet life and English nature — he would be ungrudgingly pronounced a great classic. As a correspondent his supremacy is generally allowed.

To his works enumerated above should be added the unpleasant satire 'Anti-Thelyphthora (1781), 'Poems from the French of Mme. de la Mothe Guyon, etc.' (1801), and 'Latin and Italian Poems of Milton' (1808). The first edition of Hayley's biography, with letters, appeared in 1803. In 1835 Rev. T. S. Grimshawe edited the life and letters in eight volumes. Southey's life and edition of the works in 15 volumes (1834–37, 1853–54) is the standard. Of the poems there are numerous editions, among the best being those of Bruce ('Aldine,' 1863), Benham ('Globe,' 1870), and Milford ('Oxford' 1905); The Poems of William Cowper' (by J. C. Bailey, 1905). Thomas Wright, author of 'The Town of Cowper' (1886), and of the best biography (1892), has edited the fullest collection of the letters (4 vols., 1904). (See JOHN GILPIN; TASK, THE.) For criticism, consult Goldwin Smith's 'Cowper' ('English Men of Letters,' 1880); Ste. Beuve's 'Causeries' (Vol. XI), and Leslie Stephen's 'Hours in a Library' (III); Gearey, Caroline, 'Cowper and Mary Unwin' (1900) and 'A Concordance to the Poetic Works of William Cowper' by John Neave (1887).

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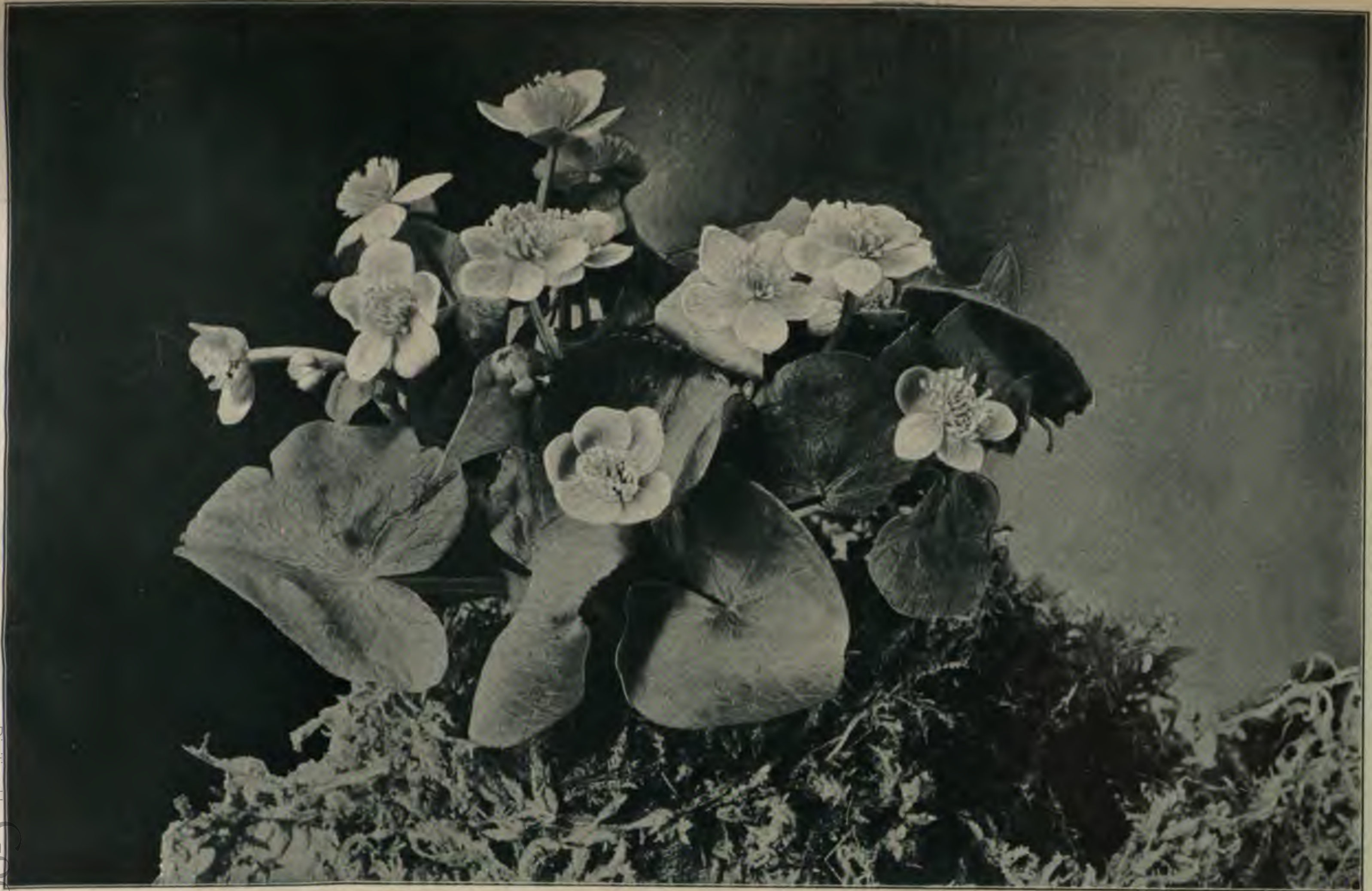
COWPER'S GLANDS, two glands discovered by an English anatomist, William Cowper, situated in male mammals behind the anterior portion of the membrane of the urethra. They secrete mucus and are active in the generative function, corresponding to Bartholini's glands in the female.

COWPOX, also known as variola, is an infectious disease of cattle characterized by fever, falling off in the milk yield and the appearance of pustules on the teats and udder. The disease ordinarily runs a harmless course and is quite prevalent, especially in the eastern part of the United States. It is not transmitted except by contact. A similar disease affects horses and sheep. As should be well known, the virus obtained from the pustules of cowpox is used in vaccinating man against smallpox. This virus produces a mild form of the disease, from which man recovers in a few weeks and is then claimed to be immune.

The disease appears in four to seven days after natural infection, or may evince itself in two or three days as the result of artificial inoculation. The attack causes a slight rise in temperature, which is soon followed by the appearance of reddened, inflamed areas, principally upon the teats and udder. These areas expand into nodules containing at first a pale serous fluid and later pus as the disease runs its course. The typical pox pustule is next present. The total duration of the disease covers about 20 days. The fallen scabs and crusts retain their contagious properties and



Photograph by J. Horace McFarland Co.

COWSLIP

tend to spread the disease if fresh cattle are brought in contact with them. In herds that receive careful attention the usual treatment consists of the application of softening and disinfecting agents to such vesicles upon the teats as may have become ruptured by the hands of the milker. Carbolized vaseline or iodoform ointment is well suited for this work. In more persistent cases the use of a milking tube is desirable in order to prevent the repeated opening of the pustules during the operation of milking. Washing the sores twice daily with a weak solution of zinc chloride (2½ per cent solution) checks the inflammation and cleanses and heals the parts by its germicidal action. When the udder is hard, swollen and painful, it is well to support it by a bandage and foment frequently with hot water. Milk from affected herds should not be given young children, as in the raw state it exercises a deleterious action on the alimentary canal. (See SMALLPOX; VACCINATION). Consult 'Abridged Agricultural Records' (Vol. III, Washington 1912); and Wilcox and Smith, 'Farmer's Cyclopedia of Live Stock' (New York 1912); 'Farmers Bulletins' (Washington, D. C.).

COWRY, a mollusk of the genus *Cypræa*, a gastropod, comprising nearly 200 species with beautifully colored shells. The cowries are mostly confined to the tropics, especially of the Old World, none occurring on the coast of South America. They live in reefs and under rocks at low water and feed on various polyps. The money cowry is *Cypræa moneta*. See WAMPUM.

COWSLIP, a popular name for several distinct species of plants, both American and European. The English cowslip is *Primula officinalis*, of the family *Primulaceæ*. It is a stemless perennial herb with a rosette of oval or oblong soft leaves, from among which arise numerous scapes 6 to 10 inches tall and bearing six or eight bright yellow, fragrant flowers in a close umbel which leans to one side. The plant has long been a general favorite in gardens where it usually receives little attention beyond an occasional stirring of the soil to remove weeds and the application of the usual winter mulch of stable manure. Several improved varieties have been produced in divers colors. The plant most widely known in America as cowslip is *Caltha palustris*, the marsh marigold, a member of the family *Ranunculaceæ*. This is a succulent perennial herb common in wet ground from the Carolinas to the Arctic regions. It has strong fibrous roots, hollow branching stems one to two feet tall, heart-shaped or kidney-shaped leaves and brilliant yellow flowers resembling buttercup, by which name the plant is sometimes called. It is often cultivated for ornament in marshy ground and has developed some improved double-flowered varieties. Its leaves and young stems are often used as a pot-herb in early spring. The American cowslip or shooting-star is *Dodecatheon meadia* of the family *Primulaceæ*. It is a stemless perennial with fibrous roots, spatulate-oblong leaves in a dense rosette from which the scape rises to a height of 9 to 18 inches or more, bearing at its summit several or many pendant pink, white or lilac flowers with reflexed petals and prominent anthers and pistils. Each flower of the cluster resembles the solitary flowers of cyclamen. Other species of the same genus are also known by the name, and like it are planted in hardy flower borders like the English cowslip.

COX, David, English landscape painter: b. Birmingham, 29 April 1783; d. Harbourne, near Birmingham, 7 June 1859. He was for several years engaged as scene-painter for various provincial and London theatres, and during a considerable portion of his early life he had to teach his art for a subsistence. His travels in Wales (1805) furnished him with material for numbers of his paintings. In 1813 he was made a member of the Society of Painters and Water-Colorists and in the following year published a treatise on 'Landscape Painting and Effect in Water Colors.' He removed to Harbourne near Birmingham in 1841. His works are chiefly of English landscape, and in water colors, in which he especially excelled, being ranked by some critics as the first of English water-colorists. At the age of 56 he began the study of oil-painting under Müller and became very skilful in the art. Cox ranks as the greatest of the successors of Constable (q.v.). His colors are light and fresh, and his treatment of light and shade is most skilful. He excels in small productions. The British Museum and the South Kensington Museum possess some of his water colors and drawings, but the best of his works are in the Birmingham Art Gallery and in private collections. An exhibition of his paintings was held in Manchester 1887. Well-known pictures by him are 'Washing Day' (1843); 'The Vale of Clwyd' (1846); 'Peace and War' (1846); 'The Summit of the Mountain' (1853). His son, David Cox (1809-85), was likewise a water-colorist of some distinction. Consult Hall, 'Biography of David Cox' (London 1881); Solly, 'Memoir of David Cox' (ib. 1875); Baldry (in 'Masters of English Landscape Painting,' ed. by Charles Holmes, New York 1903).

COX, SIR George William, English clergyman and historical writer: b. Benares, Hindustan, 10 Jan. 1827; d. Walmer, England, 9 Feb. 1902. He was educated at Rugby and Trinity College, Oxford, and took orders in 1850. From 1850 till 1851 he was curate of Salcombe Regis, Devon; from 1854 till 1857, of Saint Paul's, Exeter, and in 1881 became vicar of Bekesborne, Kent. From 1881 till 1897 he was rector of Scrayingham, Yorkshire. He succeeded his uncle in the baronetcy in 1877. In 1891 he was chosen bishop of Natal by the friends of Bishop Colenso (q.v.) but the archbishops and bishops of England refused him consecration. He published 'Poems Legendary and Historical' (with the historian Freeman, 1850); 'Life of Saint Boniface' (1853); 'Tales from Greek Mythology' (1861); 'The Tale of the Great Persian War, from Herodotus' (1861); 'Tales of the Gods and Heroes' (1862); 'Tales of Thebes and Argos' (1864); 'A Manual of Mythology' (1867); 'Tales of Ancient Greece' (1868); 'The Mythology of the Aryan Nations' (1870); 'Latin and Teutonic Christendom' (1870); 'History of Greece' (1874); 'The Crusades' (1874); 'The Greeks and Persians' (1876); 'The Athenian Empire' (1876); A General History of Greece' (1876); 'History of the Establishment of British Rule in India' (1881); 'Introduction to Science of Comparative Mythology and Folk Lore' (1881); 'Short Historical Anecdotes' (1882); 'Lives of Greek Statesmen' (1885–86); 'Concise History of England and the English People' (1886); 'Life of John William Colenso, Bishop of Natal,' perhaps his most important work (1888); The Church of England and the Teaching of Bishop Colenso' (1888).

COX, Isaac Joslin, American educator: b. West Creek, Ocean County, N. J., 19 Nov. 1873. He was educated at Dartmouth College and at the universities of Texas, Chicago, Wisconsin, and Pennsylvania. Between 1896 and 1906 he was instructor and vice-principal at San Antonio Academy and instructor in history at the University of Cincinnati, where he was afterward assistant professor. In 1911–12 he was Shaw lecturer at Johns Hopkins University. He has published 'The Journeys of La Salle and his Companions' (2 vols., 1905); 'The Early Exploration of Louisiana' (1906); 'The Indian as a Diplomatic Factor in the History of the Old Northwest' (1910). He is actively engaged on a series of frontier studies covering the early relations between Spain and the United States.

COX, Jacob Dolson, American statesman and soldier: b. Montreal, 27 Oct. 1828; d. Magnolia, Mass., 4 Aug. 1900. He was graduated at Oberlin in 1851 and became a lawyer; but upon the outbreak of the Civil War was made brigadier-general of Ohio Volunteers. In 1862 he became major-general of the United States Volunteers, and in 1864 commanded a division at Nashville. At the close of the war he resigned his command and entered the practice of law in Cincinnati. He was elected governor of Ohio in 1865, and in 1869 became Secretary of the Interior in President Grant's Cabinet until 1870 when he resigned. In 1873 he became president of the Wabash Railroad and removed to Toledo to take charge of his new work. He was representative to Congress from October 1877 to March 1879. The University of North Carolina and Davison University, Ohio, conferred on him the degree of LL.D. He has published 'Atlanta'; 'The March to the Sea'; 'Franklin and Nashville'; 'The Battle of Franklin.'

COX, James M., American journalist and statesman: b. Jacksonburg, Ohio, 31 March 1870. After a public-school education he was employed in a printer's office, taught a country school, became a newspaper reporter, and was for a time on the editorial staff of the Cincinnati *Enquirer.* In 1898 he became proprietor of the Dayton *Daily News* and in 1903 of the Springfield *Press-Republic,* thus forming the News League of Ohio. From 1909 to 1913 he was a member of Congress. He was governor of Ohio from 1913 to 1915.

COX, Kenyon, American painter: b. Warren, Ohio, 27 Oct. 1856. He studied in Cincinnati and in Pennsylvania Academy of Design and, from 1877 to 1882, in Paris under Carolus Duran and J. L. Gérôme. In 1883 he settled in New York and painted subjects of many kinds, including portrait, landscape and ideal figure compositions, and also illustrated and wrote on art subjects. Since 1892 Cox has been known principally as a mural-painter, having executed important decorative work in the Library of Congress at Washington, D. C., in the State capitols of Minnesota, Iowa and Wisconsin, in county courthouses at Newark, N. J., and Wilkes-Barre, Pa., in the Public Library at Winona, Minn., and in other public buildings. He modeled a statue of "Greek Science" for the front of the Brooklyn Institute of Arts and Sciences. He has received various awards and medals, including the Medal of Honor for Mural Painting of the Architectural League in 1910. He is represented by pictures in the National Gallery of Art at Washington, D. C., the Metropolitan Museum, New York, the Cincinnati Museum and other public collections. He received the degree of M.A. from Yale University and of Litt.D. from Oberlin and Dartmouth. He was a member of the Society of American Artists from 1882, becoming its vice-president at the time of its union with the National Academy of Design in 1906. He is also a member of the American Academy of Arts and Letters, the National Academy of Design, the Architectural League of New York and president of the Mural Painters. He has published six volumes of criticism on art, 'Old Masters and New'; 'Painters and Sculptors'; 'The Classic Point of View'; 'Artist and Public'; 'Winslow Homer'; and 'Concerning Painting' (1917), besides numerous reviews and magazine articles.

COX, Louise Howland King, American artist: b. San Francisco, Cal., 23 June 1865. She was a pupil of the National Academy of Design, and of Kenyon Cox (q.v.), whom she married 30 June 1892. In 1896 she won the third Hallgarten prize of the National Academy of Design, and in 1900 was awarded a bronze medal at the Paris Exposition. She was also awarded a silver medal at the Pan-American Exposition, Buffalo 1901; the Julia A. Shaw Memorial Prize, Society of America Artists, 1903; and a silver medal, Louisiana Purchase Exposition, Saint Louis 1904. She was a member of the Society of American Artists before its union with The National Academy of Design and is an Associate of the Academy. She is represented in the National Gallery of Art (Evans Gift), Washington, D. C.

COX, Palmer, American artist and writer for young people: b. Granby, Quebec, 28 April 1840. Since 1875 his home has been in New York. His works are both written and illustrated by himself. He is best known by his 'Brownie Books,' a very popular series containing humorous pictures and verse for children. Other productions are 'Hans Von Petter's Trip to Gotham' (1878); 'How Columbus Found America' (1878); 'Queer People' (1888), etc. His 'Brownies in Fairyland,' a cantata in two acts, and 'Palmer Cox's Brownies,' a spectacular play in three acts, were produced for several years, on the stage, throughout the United States and Canada.

COX, Samuel Hanson, American Presbyterian clergyman: b. Rahway, N. J., 25 Aug. 1793; d. Bronxville, N. Y., 2 Oct. 1880. He undertook to study for the legal profession, but abandoned it for theology and was ordained to the Presbyterian ministry in 1817. From 1817 to 1821 he held a pastorate at Mendham, N. J., and in the latter year removed to New York, holding two pastorates there until 1834. His prominence as a leader of the anti-slavery movement made him unpopular and on one occasion his house and church were sacked. He helped to found the University of the City of New York, now New York University; in 1834–37 served as professor of pastoral theology at Auburn, and in the latter year became pastor of the First Presbyterian Church of Brooklyn. He also served as professor of church history at the Union Theological Seminary. His voice failed in 1854, and he resigned his pastorate and his chair at the seminary, and removed to Owego, N. Y. He was a noted orator and is well remembered for a speech at Exeter Hall in 1833, in which he took the British government to task for the continuance of slavery in America. He wrote 'Quakerism not Christianity' (1833) and 'Interviews, Memorable and Useful' (1853).

COX, Samuel Sullivan, American statesman and author: b. Zanesville, Ohio, 30 Sept. 1824; d. New York, 10 Sept. 1889. He was graduated at Brown University in 1846 and was later admitted to the bar, but forsook the law in 1853 to become editor of the *Ohio Statesman* at Columbus. For one year he was secretary of legation in Peru. He was a Democratic member of Congress from Ohio 1857–65; and from New York 1869–85, and 1886–89. He was also for a short time Minister to Turkey. He was popularly known as the «letter-carriers' friend» in reference to legislation proposed by him for increase in their salary and the concession to them of a vacation with pay. A statue of him was erected by the letter-carriers in Astor Place, New York. A glowing piece of descriptive writing published in the *Statesman* during his editorship won him the nickname «Sunset,» which clung to him through life. He was a popular lecturer and published 'Eight Years in Congress' (1865); 'Why We Laugh' (1876); 'Diversions of a Diplomat in Turkey' (1887); 'A Buckeye Abroad'; 'Arctic Sunbeams'; 'Orient Sunbeams'; 'Search for Winter Sunbeams'; 'Free Land and Free Trade,' etc.

COXALGIA, or **COXITIS**, a term formerly applied to a disease of the hip-joint. It is characterized by inflammation, sometimes accompanied by suppuration, which leads to stiffness of the joint and its final destruction by necrosis.

COXCIE, kŏk'sē, or **COCXIE, Michel**, Flemish painter and engraver: b. Mechlin 1499; d. there, 10 March 1582. He was a pupil of Bernard van Orley, and traveled to Rome, where he remained several years, attracted by the works of Raphael, with whom he was probably personally acquainted. Here he executed several paintings in fresco, and many other pieces. He also painted the 'History of Cupid and Psyche,' in the style of Raphael, which was engraved on 32 copper-plates. In the Imperial Gallery of Vienna we find a Madonna with the Infant Jesus by him. He was the first Fleming to attempt lifesize frescoes in the style of the Roman school. He was appointed court painter by Philip II of Spain and commissioned to copy the altar-piece of the brothers Van Eyck (q.v.) in Ghent. He possesses a cold, but clearly defined style. There are some good examples of his painting in the Escorial and in the museums of Brussels, Antwerp, Madrid, Vienna and Prague. His works are rare, even in the Netherlands.

COXE, Arthur Cleveland, American Protestant Episcopal prelate and author: b. Mendham, N. J., 10 May 1818; d. Clifton Springs, N. Y., 20 July 1896. He was a son of S. H. Cox (q.v.), but adopted an older spelling of his surname. He took orders in the Episcopal Church in 1841; and after holding rectorships at Hartford, Conn., Baltimore, Md., and New York was consecrated bishop of western New York in 1865. In 1872 he visited Haiti to establish churches and ordain clergy. He also founded the Christian Literature Company of whose publications he edited a series of Ante-Nicene fathers. He was a vigorous, powerful prose writer, and his 'Christian Ballads' (1840) was long popular. His other works include 'Athanasian and Other Poems' (1842); 'Saul, a Mystery, and Other Poems' (1845); 'Thoughts on the Services'; 'Impressions of England' (1865); 'The Criterion' (1866); 'Apollos, or the Way of God' (1873); 'Institutes of Christian History' (1887); 'The Pascal,' a collection of Eastern poems (1889).

COXE, Tench, American economist: b. Philadelphia, Pa., 22 May 1755; d. there, 17 July 1824. At first a Royalist he became a Whig, was a member of the Annapolis Convention 1786; the Continental Congress 1788; Assistant Secretary of the Treasury 1790; Commissioner of the Revenue 1792–97; and purveyor of public supplies 1803–12. He early devoted much attention to political economy, and his writings and ideas on this subject constitute his chief claim to remembrance. He favored the prohibition of the coasting trade to foreign shipping; the importation of foreign goods only in ships of the country producing them; the special encouragement of manufactures; and the exemption of raw materials from tariff duties. He urged the South to take up cotton-raising, is sometimes called the father of the American cotton industry, and is said to have been the first to attempt to bring an Arkwright machine to the United States. His publications are 'Inquiry into the Principles on Which a Commercial System for the United States Should be Founded' (1787); 'Examination of Lord Sheffield's Observations on the Commerce of the American States' (1792); 'View of the United States of America' (1794); 'Thoughts on Naval Power and the Encouragement of Commerce' (1806); 'Memoir on Cultivation, Trade, and Manufacture of Cotton' (1809); 'Statement of the Arts and Manufactures of the United States for the Year 1810' (1814), the first extended attempt to make an industrial census of the country.

COXE, William, English historian and traveler: b. London, 7 March 1747; d. Bemerton, Wiltshire, 16 June 1828. He was educated at King's College, Cambridge, and in 1771 took the curacy of Denham, but soon resigned to become the tutor of several young noblemen. With them he spent many years in travel. He published an account of his travels through Switzerland (1779), and through Poland, Russia, Sweden and Denmark (1784–92), which have been translated into almost all the languages of Europe. In 1786 he became a vicar again. He was made prebend of Salisbury in 1791 and archdeacon of Wiltshire in 1804. As historian he brought himself into notice by his 'Memoirs of Sir Robert Walpole' (1798), followed by those of Horatio, Lord Walpole (1802). He then published his 'History of the House of Austria from 1218 to 1792' (1807); afterward 'Memoirs of the Kings of Spain of the House of Bourbon, from 1700 to 1788' (1813); 'Life of Gay' (published separately from his Fables, 1897).

COXSWAIN, or **COCKSWAIN**, a minor officer on board of a ship, who takes charge of a boat and the boats' crew in the absence of superior officers. The term also designates the helmsman of a racing crew.

COYOTE, kī'ō-tę or koi'ō-tē, prairie wolf (*Canis latrans*), native to the western United States, and before the advent of civilization numerous as far east as the extent of the prairies of the Mississippi Valley, where it was called the red wolf in distinction from the large gray or timber wolf (q.v.). At present it is abundant from the dry plains of Texas, Nebraska and Manitoba, westward to the Pacific coast, south of central British Columbia, and also in Mexico. Throughout this wide range it supports itself easily in spite of civilization, and at night its long-drawn cry, more like a bark than a howl, may be heard for long distances; and, owing to its predatory habits, this wailing call inspires terror in its possible victims and rouses the anger of the western ranchman whose flocks and herds are apt to suffer from the inroads of the barking wolf, as the coyote is sometimes called.

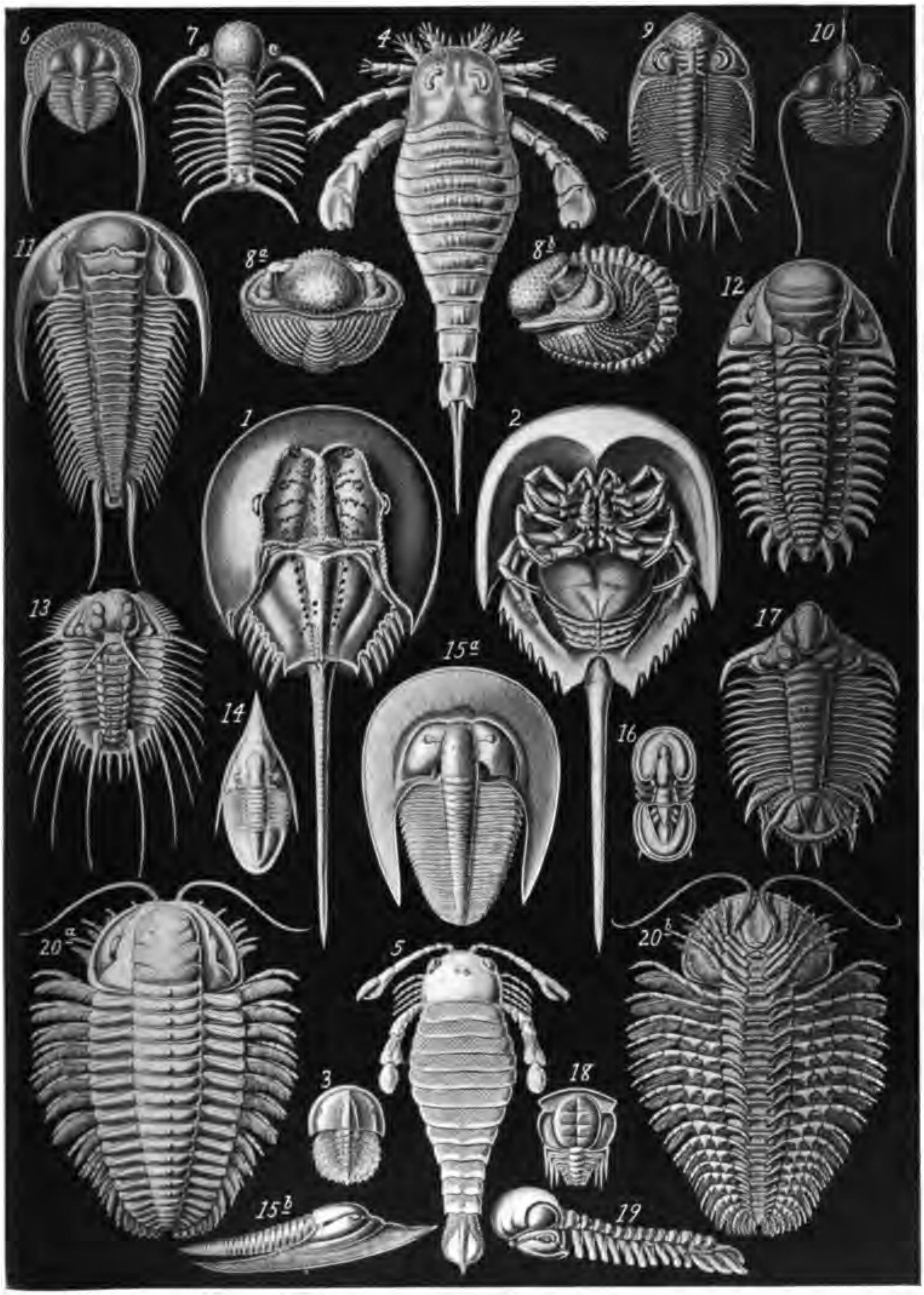
Coyotes are smaller than other wolves, being about the size of setter dogs, and, although they often travel in packs, as do other wolves, they are cowardly where man is concerned, and confine their raids to the brute creation. Their fur is soft, reddish or tawny-gray in color, sometimes slightly tipped with black. The tail is bushy, the ears upright and the slender muzzle very pointed. The coyotes live in hollows among rocks, or in deserted burrows, whence they usually issue at dusk, to hunt. Their food is chiefly gophers, mice, ground-nesting birds, prairie-dogs and other small animals, their depredations on sheep-folds and cattle-ranches being mainly reserved for winter. In former days they were persistent enemies of the prong-horns. They are fleet footed, cunning in avoiding snares and adapt themselves readily to varying conditions,— hence they increase rather than diminish in the more isolated regions where they are found. They were well known to the Western Indians and formed the basis of some breeds of their dogs. Many tales of American Indian folk-lore in these tribes are concerned with them. Consult Elliott, 'Synopsis of Mammals' (1901); Ingersoll, 'Wild Neighbors' (1897).

COYPEL, kwä'pĕl, a celebrated family of French artists (1) Noël: b. 25 Dec. 1628; d. Paris, 24 Dec. 1707. After he had embellished, by the royal command, the old Louvre with his paintings (from the cartoons of Lebrun), and had in like manner adorned the Tuileries, the Trianon and the Hôtel des Invalides, he was appointed a director of the French Academy in Rome. His four pictures for the Council Hall at Versailles — Solon, Trajan, Severus and Ptolemy Philadelphus — excited the admiration of connoisseurs. His chief works are the 'Martyrdom of Saint James' (in the church of Notre Dame), 'Cain Murdering His Brother' (in the Academy), the 'Trinity and the Conception of the Holy Virgin' (in the Hôtel des Invalides). Coypel had a rich imagination, drew correctly, understood expression and was an agreeable colorist. He wrote a 'Dialogue sur le coloris,' published by Caresme (Paris 1741). (2) Antoine, his son, b. Paris, 12 April 1661; d. there, 7 Jan. 1722. At the age of 20 he was elected member of the Academy; in 1707 he became professor there and president in 1714. He was made painter to the king in 1716, and painted a great number of pictures for the royal palaces and the churches of Paris. Among his best works are 12 subjects from the Æneid, a portrait of Molière and 'Athalie chassee du Temple.' The designs of the 'Histoire numismatique du règne de Louis XIV' are mostly his. His collected lectures were published under the title 'Discours sur la peinture' (Paris 1721). His pictures are to be found in nearly all of the museums of his provinces. (3) Noel-Nicolas: b. Paris, 18 Nov. 1690; d. there, 14 Dec. 1734. He excelled in pastel painting. His best-known pictures are 'Triomphe de Galatheé' and paintings in the chapel of the Virgin at the church of Saint Saviour. He became a member of the Academy in 1720, professor and court-painter in 1731. (4) Charles-Antoine, etcher, painter and dramatist, son of Antoine (q.v.): b. Paris, 11 July 1694; d. there, 14 June 1752. He studied with his father. At court his dramas made him very popular, especially 'Les folies de Cardenio' (1724). His 25 pictures from the history of Don Quixote (at the palace of Compiègne) were very well known. He painted in pastel and also numerous portraits. The principal illustrations of the 'Comèdies de Molière' are also the work of this versatile artist. In 1715 he became a member of the Royal Academy; professor in 1720, chief court-painter in 1747 and director of the Academy in the same year; and later chief painter to the Duke of Orleans who became his pupil. Consult Caylus, 'Vie des peintres' (Paris 1910).

COYPU, koi-poo', or **NUTRIA**, an aquatic rodent (*Myopotamus coypu*), native to South America. It is known colloquially as the nutria, or otter, in the countries where it is found, and its pelt furnishes the fur commercially misnamed as "otter." It is dull brown, has a gray muzzle and red incisors. Its nostrils are so set that it can breathe when all immersed except the tip of its nose. It is somewhat smaller than the beaver, and has a slender, rat-like tail. It is distinctly aquatic, dwelling in ponds, and burrowing into the banks, or building platform-nests among the reeds on the shore. Owing to the threatened extermination of the coypu local laws have been enacted for its protection as a valuable fur-bearing animal, and it has been saved by these and by a smaller demand for its pelt. Its call is like the moan of a human creature in pain; and when a female and her family of eight or nine take to the water they become very noisy, as well as playful. Consult Hudson, 'The Naturalist on the La Plata' (1892).

COYSEVOX, kwäs'vōks', **Antoine**, French sculptor: b. Lyons, 29 Sept. 1640; d. Paris, 10 Oct. 1720. He studied with Lerambert was admitted to the Royal Academy in 1676, was employed by Louis XIV in decorating Versailles and the palace at Marly. Among his best works are an equestrian statue of Louis XIV;

TRILOBITES AND KING CRABS



1–3 Limulus moluccanus, King Crab — upper — lower views are larva
4 Eurypterus Fischeri
5 Pterygotus Anglicus
6–20b Trilobites of various forms

the statue of Cardinal Mazarin; the tomb of Colbert; the group of 'Castor and Pollux;' the 'Sitting Venus;' the 'Nymph of the Shell;' the 'Hamadryad;' the 'Faun with the Flute;' 'Pegasus and Mercury,' and many portrait busts and statues of the most famous men of the day, including Mazarin, Richelieu, Condé, Fénelon, Racine, Charles Le Brun and Maria Theresa of Spain. He carved also a number of memorials.

COYUVOS, kō-yoo'vōz, natives of the Cuyos islands, Philippines (q.v.). They are of Tagbanua stock of the civilized branch known as Silanganen and speak the Tagbanua language. They are Christians. See TAGBANUAS

COZENS, John Robert, English water-color painter: b. 1752; d. 1799. He was instructed by his father, Alexander Cozens, who was one of the two natural sons of Peter the Great by a woman of Deptford. In 1776 he visited Switzerland, with Payne Knight, and in 1783 returned from an extended tour in Italy with William Beckford, who commissioned many of the washed drawings which he then executed. Among his English subjects are some fine studies of trees made in Windsor Forest. The date of his death has been usually stated as 1799, but there is reason to believe that he was alive after 1801. In his treatment of out-of-door scenery he is a forerunner of the Impressionists. Turner and Constable have learned much from him. 'Hannibal Crossing the Alps' was the most famous of his pictures in his day, but it cannot be located.

COZUMEL, kō-soo-māl', an island in the Caribbean Sea, off the coast of Yucatan, in lat. 20° 34′ N.; long. 86° 44′ W. It is 30 miles long, by about 8 miles broad, and is low and covered with trees. It is fertile and abounds in fruit and cattle. Numerous interesting remains of ancient buildings have been discovered on it. When visited in 1518 by Juan de Grijalva it contained a numerous population, and was much resorted to as a place of peculiar sanctity by the Indians of the neighboring continent.

CRAB, the name applied to any of the brachyurous or short-tailed decapod crustacea, comprising numerous forms, which, with the exception of a very few fresh-water species, are inhabitants of the ocean. In the crabs the abdomen is folded under the chest (cephalothorax), while the antennæ are short and small. The group includes among others the spider-crabs (*Hyas*, *Libinia*, etc.), which have a somewhat spherical body with long sprawling legs. The shore-crabs are represented by the species *Cancer*, which are among the largest of the order. They have a broad shell or carapace, without a prominent beak, or rostrum. There are nine gills on each side. Of the two species on the New England and Canadian coast, *C. irroratus* is the more common, and often used for food, and *C. borealis* is less abundant. A fossil species (*C. proavitus*) has been detected by Packard in a collection from the Miocene Tertiary green-sand beds of Gay Head, Martha's Vineyard. It appears to have been the source from which the two existing species arose by divergent evolution. Allied to Cancer is the mud-crab (*Panopæus*).

The soft-shelled crab of the markets is *Callinectes sapidus;* it is so called from being captured soon after molting, when its shell is still soft. The fiddler-crabs (*Gelasimus*), so abundant on our shores, dig holes near high-tide mark, closing the entrance with their larger claw. The oyster-crab is soft-shelled from living within the shell of bivalves. (See COMMENSALISM). The land-crabs of the tropics live away from the sea, only going to it to lay their eggs in the water during the spawning season. Most crabs are flesh eaters. They are very active and are remarkable for their gait, running sideways rather than straight ahead. The rear pair of limbs are generally expanded at the extremities into a blade for swimming. Their development is accomplished by metamorphosis through several successive stages or molts. (See CRUSTACEA). They vary in size from the giant crab of Japan, which is about 18 inches long and 12 inches across the disc, but often has legs over 3 feet in length, to the little pea crabs often found in oysters. The crab forms an article of food for many kinds of fish and is used as human food in various parts of the world. Crabs are generally caught in wicker traps, baited with meat; they are also taken with shallow hooped nets which are baited and hauled rapidly at intervals. The crabs are kept for market in floating pens, and are shipped alive packed in seaweed. (See also HERMIT-CRAB; PALM OR ROBBER-CRAB; and the various groups and species above mentioned). Consult Calman, «Crustacea» (in Lankester's 'Treatise on Zoölogy,' London 1909); Calman, 'The Life of Crustacea' (New York 1911). For fossil forms and history consult Ortmann, 'Das System der Decapodenkrebsen' (in *Zoologische Jahrbücher*, Vol. IX, Jena 1896); Zittel, 'Textbook of Paleontology' (Vol. I, London and New York 1900).

CRAB-APPLE, a plant of the genus *Pyrus* belonging to the apple family (*Pomaceæ*). The genus comprises about 15 species, natives of the temperate zone of the northern hemisphere. The term crab-apple is applied rather vaguely to any sour or uncultivated species of the apple family, but strictly it belongs to the varieties of *baccata*. The species best known in America is *P. angustifolia*, the narrow-leaved crab-apple, which is a small tree, reaching 30 feet in height, with a diameter of 10 inches. It grows in thickets from New Jersey to Illinois and Kansas, and south to Florida and Louisiana. The American crab-apple, *P. coronaria*, grows to the height of 25 feet, and has a diameter of 12 inches. The wood is soft, and of a reddish-brown color. In both trees the wood weighs about 44 pounds to the cubic foot. The American crab-apple grows from Ontario west to Michigan, and as far south as South Carolina. Its fruit is about one and a quarter inches in diameter, greenish-yellow, very fragrant and externally acid. This tree is known also as the sweet-scented crab-apple. Other species grow farther south and west; one species, *P. loensis*, known as the western crab-apple, resembling the American crab-apple, is found from Minnesota eastward through Wisconsin and Illinois, and extends south and west through Kentucky to Louisiana and Indian Territory. The cultivated crab-apple requires about the same treatment as the true apple. See APPLE.

CRAB-EATING DOG, a fox-dog (*Canis cancrivorus*), native to eastern South America from Guiana to northern Argentina, but said to be quite unknown on the pampas. It is somewhat smaller than the colpeo of the extreme south, and less handsome in color. In this respect it is subject to great variation, ranging from black, with bright red on the legs, to dull gray with very little black on the back, but the tip of the tail is always black. It is a forest or jungle-dwelling animal, feeding upon rodents and birds and upon crustaceans, whence its English and Latin name. It does much damage to poultry in the inhabited districts; when hunting in the woods it follows its prey by scent, but in the open it is said to hunt by sight.

CRAB-EATING ICHNEUMON, ĭk-nū'-mŏn, a mungoose (*Herpestes urva* or *cancrivorus*), native to southern Asia from the slopes of the Himalayas to southern China and Assam. It is said to be partially aquatic in habits and to live on frogs and especially on crabs, whence its name. It is, however, little known scientifically.

CRAB-EATING RACCOON, a kind of raccoon (q.v.) native to South America (*Procyon cancrivorus*), considerably larger than the northern raccoon and having shorter fur and proportionately much larger teeth. It is found from Panama to Colombia and Guiana. The darker sort, found farther south, has often been considered as a distinct species, and called the black-footed raccoon. In habits, these South American raccoons are much like their northern relatives.

CRAB GRASS, or FINGER GRASS (*Syntherisma sanguinalis*), belongs to the family *Poaceæ*, or grass family. It is a very common annual grass found throughout the United States and thriving in warm weather. It has erect or decumbent stems which often grow two or three feet high and bear from 4 to 15 erect or spreading spikes, which carry the flowers and fruit. It is cultivated in the southern States for hay and pasturage. The hay is easily injured if wet while curing. Its value is similar to that of Bermuda grass. It was introduced from Europe, where it is a weed, although it is cultivated on sandy land in Bohemia, the fruit being used for porridge. In the northern parts of the United States, owing to its strong roots it is difficult to eradicate and is regarded as a bad weed.

CRAB ISLAND, West Indies. See VIEQUES.

CRAB-LOUSE (*Phthirius inguinalis*), a wingless insect of the family *Pediculidæ* or suctorial lice, which is usually classified under the *Hemiptera*. It is different in shape from the other lice, having a short and broad crab-like appearance. It is whitish, with the thick legs and claws reddish, and is nearly one-tenth of an inch in length. The crab-louse infests the pubic regions of the human body, sometimes occurring among the hairs of the arm-pits, or even of the eye-brows. The insect attaches its eggs in great numbers to the hairs, as may easily be seen with an ordinary reading-glass; and the young half burrow beneath the skin, clinging tenaciously. The itch or disease called phthiriasis is due to the attacks of this repulsive pest, when occurring in great numbers. The virulence of the disease in ancient writings was probably exaggerated. Sharp suggests that in the cases of disease attributed to this insect the patient was suffering from some other disease, but being in a neglected and filthy condition was horribly infested with these disgusting creatures. Red precipitate, and any oily or greasy applications, together with frequent use of carbolic acid soap are efficient remedies.

CRAB-SPIDER, a small spider of the family *Thomisidæ*, so-called on account of its laterally bent legs and side-wise progression. The body is much depressed and the ocelli arranged in two parallel transverse rows. The *Thomisus vulgaris* and other species are common in the United States. They spin no webs except for the support of the cocoon, but pursue their prey which, owing to their flat bodies, they are enabled to seek in crevices. The claws or talons of this spider are very large and strong; sometimes they are removed, set in gold, and used as tooth-picks, being supposed to have medicinal properties as prophylactic of toothache. The name is also applied to the bird-catching spider (q.v.).

CRABB, George, English lawyer and philologist: b. Palgrave, England, 8 Dec. 1778; d. Hammersmith, England, 4 Dec. 1854. He studied in Germany, and on his return to England published a series of German textbooks which were long in use. In 1829 he was admitted to the bar. He was the author of 'Dictionary of English Synonyms' (1816; 10th ed., 1849); 'An Historical Dictionary' (1825); 'Mythology of All Nations' (1847); 'A Technological Dictionary'; 'A History of the English Law'; 'A Digest and Index of All the Statutes at Large,' (4 vols., 1841–47); 'A Technical Dictionary of Terms Used in Science and Art'; and 'A Dictionary of General Knowledge.'

CRABBE, George, English poet: b. Aldeburgh, Suffolk, 24 Dec. 1754; d. Trowbridge, Wiltshire, 3 Feb. 1832. He early showed a passion for reading. After a short time at school he was apprenticed to a village doctor and afterward to a surgeon. He contributed verse to *Wheble's Magazine* after 1772. He continued his medical studies in London and returned to his native place to practise his profession. He abandoned the profession in 1780 and went to London to pursue a literary career. In that year he published 'The Candidate,' but its failure disheartened him and he called upon Burke, who took him under his protection and helped to publish 'The Library' (1781). At Burke's direction he entered the Anglican ministry, was chaplain to the Duke of Rutland, held several other church livings, the last of which was Trowbridge, where he remained from 1814 until his death. Among his best-known poems are 'The Village' (1783); 'The Newspaper' (1785); 'The Parish Register' (1807); 'The Borough' (1810); 'Tales in Verse' (1812) and 'Tales of the Hall' (1819). Crabbe was popular in his time, being praised by Dr. Johnson, Scott, Byron and Wordsworth. His reputation has declined greatly since his day, but he is still important for his realism and tragic portrayal of the lives of the people in old East Anglia. (See PARISH REGISTER, THE). Consult 'Works,' with memoir by his son (8 vols., London 1835; 1 vol., 1901); Ainger, A., 'Crabbe' (New York 1902); Huchon, R., 'George Crabbe and His Times' (1907); and Courthope's essay in Ward, 'English Poets' (London 1884).

CRABETH, krä'bĕt, Dirk and Wouter, two famous Dutch glass painters of the 16th century: b. Gouda. Both traveled in Italy, Wouter especially being influenced by Raphael, and then each established a glass factory at Gouda. Wouter's paintings are found in France and Italy, but the best work of both brothers is in the Saint Janskerk in Gouda, where Dirk painted seven windows, of which 'Driving the Traders from the Temple,' 'The Baptism by John' and 'The Last Supper' are the finest, and show more brilliant coloring than those of Wouter. The others are 'The Sacrifice by Elijah before the Priests of Baal'; 'Washing the Disciples feet'; 'Queen of Sheba before Solomon' and 'The Sacrilege of Heliodorus.' Wouter died about 1581, 20 years before his brother. His work was of wider range than Dirk's, including some portraits and archer groups in the Museum of Gouda, and excelled it in drawing and in treatment of lights. Portraits of the brothers, who were bitterly jealous of each other, are in the Saint Janskerk. Wouter's grandson Wouter was an historical painter. Consult Westlake, 'History of Design in Painted Glass' (Vol. IV, London 1894).

CRABTREE, Charlotte (best known by her stage name LOTTA), American actress: b. New York 1847. She made her first appearance on the stage when six years old in an amateur performance. At the age of 10 she played the part of Gertrude in the 'Loan of a Lover' at Petaluma. In 1863 she appeared in New York in spectacular plays at Niblo's Garden, and first gained a reputation in John Brougham's 'Little Nell and the Marchioness.' She soon became a favorite with the American public in pronounced comedy, playing parts especially written for her. Her chief successes have been as 'Topsy,' 'Sam Willoughby,' 'Fire-fly,' 'Musette,' 'Zip,' 'Bob,' 'The Little Detective,' and 'Nitouche.' She retired from the stage in 1891, having acquired a fortune. Consult Welch, in McKay and Wingate's 'Famous American Actors of To-Day' (New York 1896); and Clapp and Edgett, 'Players of the Present' (in Dunlap Society Publications, ib. 1899).

CRACKER. See BISCUIT.

CRACKER INDUSTRY, The. There is, perhaps, no branch of American enterprise that has enjoyed more phenomenal development during the past few years than the cracker, or biscuit, industry, for certainly there is no other single avenue of commercial endeavor that is so far reaching in its source of supply, or which brings its perfected product into so many homes.

While we have derived the name "biscuit," from the French, it originally came from the Latin, having been a word that was used to signify that the bread eaten by the Roman soldiers was sent twice to the oven. Thus, its actual meaning, "twice baked." Just how, or when it first came to be used in France, nobody can tell, but it reached the United States via England sometime about the middle of the 19th century. Prior to that time such a title had never been applied to the product of our bakeries, although in Europe almost every article of food in the form of a sweet, flavored cake had long been known as a biscuit.

It was in the latter part of the 18th century that some bakers in the United States began to produce crackers. They were crude articles of food, made of plain and unsweetened dough, always unflavored, but crisp. The reception which this product received, however, was so favorable that their use in this country not only continued to increase but there was an ever-widening demand from abroad, where the name "cracker," was dropped, all such products promptly being absorbed into the generic title, "biscuit." The name "cracker" was retained in America, however, until within the past few years, when the term "biscuit" has been adopted in some cases as a more sweeping classification.

So far as we have any authentic record, the first cracker bakery in the United States was that of Theodore Pearson, at Newburyport, Mass. Beginning business in 1792, his specialty was a large cracker which was known both as "pilot" and as "ship" bread. It was a large, round, clumsy, crisp affair, but it met the demands of the merchant marine who were glad to purchase any article of food that could be depended upon to keep for a longer period than ordinary bread.

Pearson's first great business rival was Joshua Bent, who erected an oven for cracker baking at Milton, Mass., in 1801. It was a comparatively small affair, being operated only three days in each week by Bent himself, assisted by other members of his family. During the other three days the product of the oven was sold throughout the country from a wagon. Insignificant as this beginning was it was the foundation of the manufacture of the celebrated Bent's water-cracker, another product of the American baker that has attained an international reputation. To-day the cracker is made as it always has been, of unleavened dough (flour, water and a little salt). Later machinery was substituted for the old hand process, by which the dough was not only mixed and kneaded by hand, but each cracker was even rolled out and shaped separately before being placed, one at a time, on the long-handled sheet-iron shovel or peel, by which they were transferred to the floor of the oval-shaped tile oven which was then in use. So far as the use of raised or fermented dough in the making of crackers is concerned, it has been only within the past half century that its practicability has been developed to any considerable degree.

It was in 1805 that Artemas Kennedy established his bakery at Menotomy, now Arlington, Mass. A few years later he removed to Westford, and, afterward, to Milton. The elder Kennedy died in 1832, but, in 1834, one of his sons, Jason Kennedy, inaugurated a similar enterprise at Charlestown, and, in 1840, a cousin who had been Jason's foreman, and who was also named Artemas Kennedy, went into business for himself at Cambridgeport, Mass. It was in this manner that the name of Kennedy became associated with the cracker industry of America.

The first cracker bakery in Boston was started by Richard Austin, in Ann street, about 1830. In 1843 he was succeeded by his brother, Thomas, and the business was continued without interruptions, but under various titles, until 1885, when it again passed into the hands of the Austins, by being purchased by J. W. Austin, a descendant of the founder of the house. At later dates other firms of prominence were established throughout New England, among them

Thurston, Hall & Company, of Cambridgeport, Mass.; John S. Carr, of Springfield, Mass.; C. D. Boss, of New London, Conn.; Parks & Savage, of Hartford, Conn., and the New Haven Baking Company, of New Haven, Conn.

The business of cracker baking in New York was introduced about 1825, when Ephraim Treadwell founded the establishment which is now conducting its operations under the name of Treadwell & Harris. During the next 25 years several other firms entered the same business, but, although some of them attained considerable distinction in their time, all have now passed out of existence. Among them were the firms of Robert Spier, Erastus Titus, John T. Wilson, C. T. Goodwin, J. Parr and J. Bruen.

It was in 1850 that Garrett B. and Edwin O. Brinckerhoff started their business on Madison street, New York. In 1857 they removed to Elizabeth street, where the Brinckerhoff branch of the consolidated company is still located. About 1860 Belcher & Larrabee established their bakery at Albany, N. Y., and in 1871 the firm name was changed to that of E. J. Larrabee & Company. In 1870 John Holmes, an Englishman, entered the services of this house, and he remained with this firm until 1877, when he entered into a partnership agreement with G. H. Coutts, under the firm name of Holmes & Coutts, opening a house which soon won both fame and fortune by its production of goods that were unlike any that had heretofore been made by American bakers. In fact, their success was so great that, a few years later, J. R. Vanderveer and D. M. Holmes erected another factory in New York, in which they also produced a high grade of goods that soon brought them more than national recognition.

It is, of course, impossible, within the limits of so brief a review, to present anything like an adequate list of the many bakeries that sprang into existence in every part of the country as soon as the success of the New England and New York bakers had become generally known. To tell the story of the cracker industry, however, it is imperative that a few of the most important of these establishments should be mentioned, among them being the firms of Hetfield & Ducker, of Brooklyn; Walter G. Wilson and A. J. Medler & Company, of Philadelphia; James Beatty, J. D. Mason and J. R. Skillman, of Baltimore; Haste & Harris, of Detroit, Mich.; the Margaret Bakery of New Orleans, La.; C. L. Woodman, D. F. Bremner and the Dake Bakery of Chicago; Garneau, Dozier & Company, later Dozier & Weyl, of Saint Louis, Mo., and S. S. Marvin & Company, of Pittsburgh, Pa.

The interval between 1840 and 1865 represents the most important period in the history of the cracker industry, for it was during this time that the mechanical processes employed in the making of these goods underwent a development that was as remarkable as it was rapid. Prior to 1840, the use of machinery in the cracker-making business was practically unknown. Even at that late date, the dough was still worked up and put into the oven one piece at a time, all being done by hand. As the demand for crackers continued to increase, however, so slow a process was a serious drawback to the progress of the industry, and it was to improve these conditions that a machine was finally invented which took the dough, after it had been prepared by hand, and rolled it into a thin sheet which, as it passed over a sort of endless belt, or apron, was cut into the required shapes by a stamp which rose and fell automatically. This invention, as manufactured, was crude enough, and yet, so far as its principle was concerned, it was very similar, except in the matter of size and capacity, to the most improved cracker-making machines of the present day.

Great as the demand for this kind of food had become, the discovery of gold in 1849 gave additional stimulus to the trade, for, among all the articles of food that were known at that time, not one was more suited to the purposes of the pioneer and the gold-hunter than the ordinary cracker. If this demand was to be met, therefore, it was necessary that a more rapid process should be devised, so, to cope with this emergency, the manufacturers began to turn the machines, which had formerly been turned by hand, first by horse power, and, finally, by steam power. By these means the capacity of the various plants was increased sufficiently to meet all requirements until the War of the Rebellion, in 1861, gave the second great impetus to the industry, for no sooner had war been declared than the demand for the cracker, then known as "hard bread," began to increase to such an extent that it was absolutely impossible for the manufacturers to keep pace with their orders. Crackers were needed, however, both for the army and for the navy, and it was to meet this imperative demand for food that the mechanical reel oven was invented. This contrivance, which practically revolutionized the cracker trade, consisted of an arrangement of long iron pans, which revolved, one over the other, with an action not dissimilar to that of the Ferris wheel. The pans, which were located in the large oven-chamber, were capable of handling so large a product that the capacity of a single oven was increased from six barrels to 25 or 30 barrels of flour a day, and practically the only change that has been made in this method of baking is in the gradual increase of the size of the reels, some of those that are used at this time having a daily capacity as great as 50, or even more, barrels of flour per oven.

The increase in the variety of goods produced by American bakers did not begin to become apparent until after the introduction of the machine method of baking. Prior to 1840, or even for some years after that date, there were only five kinds of crackers that were known to the general trade, and the few exceptions were products that were of purely local invention and sale. The standard crackers, in this period, were the old-fashioned "pilot-bread," the original hard cold-water crackers made by the Bents, the soft or butter cracker, and the square and round soda biscuit. The last three varieties differed from the older cracker both in the fact that they were products from a fermented dough, and that they contained shortening, either of butter or lard. Of these crackers, the most popular varieties for ordinary use were those that had been produced by the process of fermentation, as they were of lighter and softer texture than the old type of hard cracker.

The sweetened, or fancy, cracker more

familiarly known as «biscuit,» is an English invention which was placed upon the market sometime later than 1855. Among the English firms that sent their goods to the American market were Huntley & Palmer, and Peak, Frean & Company, but the products of both houses were sold so widely that they soon found it necessary to establish distributing agencies in every large city of the country. As all the important grocery houses in the United States were selling these goods, and as everybody who could afford such luxuries were buying them, it did not take long for the domestic manufacturers to recognize the fact that this was an avenue of trade that must not remain closed to the bakers of this country. Belcher & Larrabee of Albany was the first firm to take steps in this matter, but as early as 1865 they sent to England for the cutters and machines necessary to the undertaking, and their attempt to produce these sweetened and fancy biscuit was so successful that other firms soon followed their example, with the result that this branch of the cracker manufacture has gradually extended until it has become one of the greatest sources of profit to the trade. In fact, so popular did the new biscuit become that the firms of H. J. McCollum of New York, and Denio & Roberts of Boston, then the most prominent makers of bakers' supplies in America, began the manufacture of all necessary appliances for the new industry, so that they were soon able to equip all domestic plants with all machinery needed to enable them to rival the operations of the best bakeries of England. As the result, the importation of English goods not only decreased to a marked degree, but, encouraged by their success in this country, several American firms, including Holmes & Coutts, the Wilsons of Philadelphia, and F. A. Kennedy, began to introduce their high-class unsweetened goods to the European market.

In 1890, in accordance with the «consolidation» idea which was then sweeping the country, the largest plants in the United States were formed into three large companies. The first, the New York Biscuit Company, included nearly all the cracker interests in New York and the New England States, its factory in New York city being the largest and most complete in this country. The American Biscuit Company represented chiefly the West and South, while the United States Baking Company had large factories in Ohio, Indiana and Pennsylvania. These three concerns, which then represented an aggregate capital of $25,000,000, and an annual consumption of flour which approximated 1,400,000 barrels, were again absorbed, in 1898, under the one title of the National Biscuit Company. With a capital of $55,000,000, and with bakeries in all the principal American cities, this company has not only revolutionized the methods of cracker-making but has introduced many novel ideas, not only in the form of new varieties of crackers, or biscuit, but in the matter of air-tight packages, and other inventions which have added greatly to the commercial value of this product of our national industry. Consult ‹The Cracker-baker, Devoted to the interests of the Cracker and Biscuit trade of the World› (Vols. I–V, New York 1912–15).

CRACKING PETROLEUM. The process in petroleum distillation known as «cracking» is the subjecting of certain distillation products to a degree of heat so far above their boiling points that they are decomposed into component parts whose boiling points are lower. It is accomplished in an ordinary fire-still by condensing vapors arising from the boiling petroleum upon the cool dome of the still, whence they drop into the superheated oil below, where they are broken up into lighter oils and instantly vaporized, passing over into the condenser. As ordinarily carried on the process aims to increase the yield of illuminating oil (kerosene) by thus cracking the heavier oils which distil over immediately after the kerosene vapors have ceased, that is, above the temperature of 625° F. When this temperature is reached the fire under the still is subdued, and the distillation continued slowly up to 700°, during which period the heavier oils dripping back are cracked into gasoline and kerosene. The additional amount of kerosene obtained from the oil is from 18 to 28 per cent.

The cracking process has more recently been invoked to secure a larger amount of gasoline from crude oil, and from kerosene, to meet the enormous demand for motor fuel. Several processes were invented, or at least patented, almost simultaneously. The Burton process in extensive operation in the United States keeps the entire contents of the still and also of the condenser under a pressure of 60 to 75 pounds to the square inch, through the manipulation of a valve, which is opened occasionally to avoid the liquefaction of the gases in the tubes. The syrupy residue of the distillation is distilled at atmospheric pressure, and its distillate returned to the cracking still. Some crude oils by this process are made to yield as much as 60 per cent in crude gasoline distillate. This is immediately available for use in marine motors, but requires deodorizing for use in automobiles.

The Hall process (American), patented in 1913, found a warm reception in England and on the Continent, and many large plants are using it. The raw material in this process is common gas oil, and the gasoline yield reaches 70 per cent of «motor spirit» as it is called, having from 18 to 31 per cent more power than ordinary standard gasoline.

In the Rittman process the petroleum vapor is passed into a tube heated to 850° F., under very heavy pressures, ranging up to 500 pounds to the square inch. This vapor is then condensed under pressure, and the resulting liquid distilled for gasoline. The yield is from 60 to 70 per cent of the original bulk of the oil, in small quantities.

Other processes first subject the oil to great heat under heavy pressure, and then distil it; or take the vapors of boiling oil through iron tubes containing a red-hot sponge of some metal; or vary the operation either in the heat and pressure in the still, or in a decomposer, or by some other manipulation, the essential features being heat and pressure. All of these processes are successful in some degree in securing an increased yield of the sought-for gasoline. Consult Bacon, R. F., and Hamor, W. A., ‹The American Petroleum Industry› (New York 1916).

CRACKLIN, or CRACKLE WARE. See CERAMICS.

CRACOW (Ger. Krakau, Polish Kraków, Lat. Cracovia or Carodunum), a city of Galicia, Austria, capital of the former Polish republic of Cracow. It stands on the left bank of the Vistula, across which it is connected since 1850 by the Franz-Joseph bridge with Podgorze. Cracow consists of the inner city, whose ramparts have long been demolished, and seven suburbs — Piasek and Kleparz in the north, Wesola east, Stradom and Kasimierz south and Wawel and Novi Sviat in the west. What remains of the old fortifications are the Florian gate and a tower dating from 1498. According to tradition Cracow was founded A.D. 700 by the Polish duke Krak (Cracus), and built with the spoils taken from the Franks. It was the Polish capital from 1320 to 1609, when Sigismund III moved his court to Warsaw, though Cracow remained the coronation site till 1764. Charles XII captured the city in 1702; it was taken and retaken several times by the Russians and other confederates. Formerly a wealthy city (it had joined the Hanseatic League in 1430), Cracow became gradually impoverished until, in 1787, its population had fallen below 10,000. The Russians, who had captured it in 1768, were expelled by Kosciusko in March 1794, but it surrendered to the Prussians three months later and was handed over to Austria in 1795, when Poland was dismembered for the third time. Together with western Galicia it formed part of the duchy of Warsaw 1809 to 1814. The Congress of Vienna made Cracow a republic in June 1815, with independence and neutrality guaranteed by Prussia, Austria and Russia. The constitution vested the legislative power in a house of representatives and a senate of eight members and a president. In consequence of repeated breaches of the constitution by the nobility, the three guarantory powers sent a commission of inquiry to Cracow in 1829. Part of the population joined the Polish revolution in 1830, which led to a Russian occupation of the republic, which was restored and reorganized in 1833. Renewed disorders brought about military occupation in 1836 and again in 1838 till 1841. Cracow became the headquarters of the insurrection in February 1846 and in a few days was seized by Russian and Austrian troops. On 6 Nov. 1846 the Treaty of Vienna (1815) was abrogated and Cracow was annexed to Austria despite the protest of England and France. In 1849 it was incorporated with the Crown land of Galicia. A great fire on 18 July 1850 laid most of the city in ashes. Violent anti-clerical riots broke out in 1869 owing to the discovery of a nun having been secluded in a convent cell for 21 years.

There are in Cracow 40 churches, numerous chapels, 25 monasteries and cloisters and 7 synagogues. Until 1060 it was the seat of an archbishop; since then of a bishop. The cathedral was erected in 1320–59 and enlarged during the 16th and 17th centuries. It contains the tombs of Polish kings, bishops and national heroes, including Sobieski, Poniatowsky and Kosciusko. Some fine marble statues are by Thorwaldsen. Other churches have historical relics and works of art dating back to the 12th century. The Krolevski castle, founded 1265, is used as a barracks and military hospital. The arsenal (1257) is now a museum and art gallery. The new university (1881–87) is a magnificent block of buildings and contains treasures of art, literature and scientific research. The old university (1364) was a renowned centre of learning during the Middle Ages and boasted over 8,000 students. It has considerably revived in the last 100 years and is now conducted in the Polish language. There are numerous schools and academies, a high school for women, a conservatoire and a horticultural training college. The population is about 170,000.

During the European War the Russians reached as far as the outer line of the defenses of Cracow, which was surrounded by a triple line of fortifications consisting of 30 forts. The Russian advance on Cracow in November 1914 came after the conquest of Galicia in September. An indecisive battle in December 1914 enabled the Austrians to check the enemy and close the gate to Silesia. It was in and around Cracow that the great Austro-German concentration took place early in 1915 for the Dunajec-Biala drive of General Mackensen, which culminated in the reconquest of nearly the whole of Galicia. See Poland; War, European — Eastern Front.

CRACOW, University of. See Cracow.

CRADDOCK, Charles Egbert. See Murfree, Mary Noailles.

CRADLE, (1) an infant's bed or cot, usually oscillating on rockers or suspended in such a way as to admit of a swinging motion. (2) In surgery, it is applied to the case in which a broken limb is laid after being set. (3) In engraving, a steel tool shaped like a currycomb, with sharp teeth used in laying mezzotint grounds. (4) As a nautical term, a cradle is the basket run on a line and carrying to land persons from a wrecked vessel; and the frame supporting a ship hauled over a marine railway. (5) The frameworks sustaining heavy guns in transportation are also called cradles. (6) In agricultural use the cradle consists of a sort of broad scythe for cutting grain. It is furnished with a set of long parallel fingers for catching the grain and laying it in swaths. (7) The cradle or rocker employed in placer-mining consists of a box agitated by hand and used for washing out gold-bearing earth.

CRADLE OF LIBERTY, a name by which Faneuil Hall, in Boston, is known. During the Revolution it was the favorite meeting-place of the American patriots. The name is also sometimes applied to the city of Boston.

CRADDOCK, Sir **Christopher,** British rear-admiral: b. 1862; d. 1 Nov. 1914. He served in the Sudan in 1881 and in China 1900. During the South African war he acted as transport service officer. Early in August 1914, after the outbreak of the war, Cradock was sent with a small squadron to protect the southern trade routes. He began by sweeping the North Atlantic, sailed through the West Indies to the coasts of Venezuela and Brazil, touched at the Falkland Islands, and toward the end of October he was cruising up the Chilean coast in the Pacific. The object of Cradock's mission was to seek the German Pacific squadron of Admiral von Spee, which had sailed from Kiao-Chau early in August. It was known to the British Admiralty that Cradock's squadron of slow and old vessels was no match for the German squadron of new and swift vessels of superior gun range. Reinforcements were daily expected from Britain or the Mediterranean, but for some unknown reasons these were not forthcoming. The surgeon of Cradock's flagship, the *Good Hope,* wrote on 25 Oct. 1914: "We think the Admiralty have forgotten their trade-route squadron 10,000 miles from London town. Five German cruisers against us. What's the betting on the field? Pray to your Penates we may prevent them concentrating." At 4 in the afternoon on 1 November the German squadron was sighted off Coronel. In the battle that ensued the *Good Hope* and the *Monmouth* were sunk, and Craddock went down with his ship. On 8 Dec. 1914 Von Spee's squadron was destroyed off the Falkland Islands by a British squadron under Admiral Sturdee. In June 1916 Mr. Winston Churchill, then First Lord of the Admiralty, stated that "the ships which composed Admiral Cradock's command bore no relation to Admiral von Spee's squadron at the other side of the world, and were never intended to be matched against it." See WAR, EUROPEAN — NAVAL OPERATIONS.

CRAFTS, James Mason, American chemist: b. Boston, 8 March 1839. He was educated at the Lawrence Scientific School, Harvard. In 1859 he went to Germany and studied at the Academy of Mines of Freiberg and at the University of Heidelberg. At the latter institution he acted for some time as private assistant to Bunsen. In 1861 he went to Paris, and there met Charles Friedel, with whom he later carried out some of his most brilliant researches. In 1865 he returned to the United States, and, after devoting some time to mining, became professor of chemistry and dean of the faculty at Cornell University, where he remained until 1870. During the following four years he was professor of chemistry at the Massachusetts Institute of Technology. In 1874 he joined Friedel in Paris, and devoted himself exclusively to scientific research. His investigations were chiefly in the field of organic chemistry. He invented a new hydrogen thermometer; measured the densities of iodine at very high temperatures. His most important achievement was the discovery, with Friedel, of one of the most fruitful synthetic methods in organic chemistry. Hundreds of new carbon compounds have been brought into existence by this method. In recognition of his services to science, the French government made him a chevalier of the Legion of Honor (1885), and the British Association for the Advancement of Science made him one of its corresponding members. In 1891 he again returned to this country, and from 1892 to 1897 was professor of organic chemistry at the Massachusetts Institute of Technology. In 1898 he became president of the institute, and in the same year Harvard conferred upon him the honorary degree of doctor of laws. In 1900 he resigned the presidency of the institute, and again turned to research work in organic and physical chemistry. His recent work concerns questions of thermometry and catalysis in concentrated solutions. The numerous results of his work were published in various scientific periodicals. He has published 'Qualitative Analysis' (1869, and several later editions).

CRAFTS, Wilbur Fisk, clergyman and author: b. Fryeburg, Me., 12 Jan. 1850. He was graduated at Wesleyan University in 1869, and Boston University School of Theology in 1872; preached as a Methodist minister from 1867 to 1879, a Congregationalist minister from 1880 to 1883, since which date he has been a Presbyterian clergyman. Later he engaged in literary work. He is secretary of the American Sabbath Union, and prominent in reform work; since 1895 he has been superintendent of a bureau of lectures, literature and law, The International Reform Bureau, which he founded in that year. Its headquarters are in Washington where it undertakes agitation in favor of Congressional legislation against various forms of vice. He is author of 'The Sabbath for Man'; 'Successful Men of To-day); 'That Boy and Girl of Yours'; 'Internationalism'; 'Prohibition Hand Book' (1911), etc.

CRAG MARTIN, or ROCK SWALLOW. A swallow closely allied to the bank swallow, which is found from Portugal eastward to China in the breeding season, migrating to the tropics for the winter. It frequents mountains and rocky river banks among hills, but does not ascend to Alpine regions. It builds in niches of the rocks a large open-topped nest of mud, occasionally placing this on the timbers of buildings or among ruins, and lays profusely speckled eggs. The general color of the adult bird is a light ashy brown above, the lower parts being creamy buff, and the tail feathers are dark brown, the central and other pairs being conspicuously spotted with white. Consult Sharpe and Wyatt, 'Monograph of the Hirundinidæ' (London 1885–94).

CRAIG, Charles Franklin, American army officer and bacteriologist: b. Danbury, Conn., 4 July 1872. He was graduated from the Yale Medical School in 1894, was appointed acting assistant surgeon in the United States army in 1898, and in 1908 became captain and assistant surgeon. Thereafter as biologist and bacteriologist he served in army hospitals at Chickamauga Park, Ga., Fortress Monroe, Havana, the Presidio, Cal., and Manila. In 1896–97 he was a member of the Army Board for the Study of Tropical Diseases; after 1909 he was assistant curator of the Army Medical Museum in Washington, at the same time acting as instructor in clinical microscopy and bacteriology at the Army Medical School in Washington; and in 1910–11 he was also assistant professor of bacteriology in the medical department of George Washington University. He has written 'The Aestivo-Autumnal Malarial Fevers' (1901); 'The Malarial Fevers and the Blood of Protozoa of Man' (1909); 'The Parasitic Amœbæ of Man' (1911); also "Malarial Fevers" (in Osler's 'Modern Medicine,' 1907); "Parasitic Disease" (in Hare's 'Modern Treatment,' 1911).

CRAIG, Edward Gordon, English actor and author: b. near London, 16 Jan. 1872. He is the son of Ellen Terry. He played his first part in a London theatre when only six years old, and appeared again in Chicago when he was 13; but his regular début was made in 1889 under Sir Henry Irving, his mother appearing in the same performance. He continued with Irving till 1897, when he left the stage and devoted himself to the study of drawing and wood engraving. In 1900 he began a series of operatic and theatrical productions in which he put in practice some novel ideas in regard to scenery and the mechanical details of stage management. His success with these innovations led him to devote his time wholly to the art of production, and in 1913 he founded a school in Florence, Italy, for the dissemination of his theories of theatrical art. He published, besides numerous magazine articles, 'The Art of the Theatre' (1905); 'On the Art of the Theatre' (1911); 'Toward a New Theatre' (1913).

CRAIG, Frank, English artist: b. Abbey Wood, Kent, 27 Feb. 1874. He was educated at Merchant Taylor's School, studied art at Cook's life class, the Lambeth School of Art and the Royal Academy Schools. He began as a painter of modern English life and contemporary history, such as the Boer War, and as an illustrator for Kipling's poems and for the London *Graphic*. He has illustrated also for *Scribner's Magazine*, *Harper's*, the *Cosmopolitan* and *Hearst's Magazine*. In 1905 he joined the new Pre-Raphaelite movement, and thereafter painted historical pictures full of expressive figures and quaint costumes, in their general color scheme often resembling Gobelin tapestries. Good examples are 'The Heretic' (1906, National Gallery, London); 'The Maid' (1907, Luxembourg); and 'The Meetinghouse of Nonconformists' (1908); 'Goblin Market' (New Zealand Academy). Among his more recent works are the curiously characteristic portraits of Sir John Jardine and Maj. Gen. Douglas Scott (1910). A good example of his early style is 'The Communion on the Velt' (1900, Durban Museum, South Africa). He was awarded a medal at the Barcelona Exhibition of 1911 and also at the Carnegie Institute, Pittsburgh, in the same year.

CRAIG, James Alexander, American Semitic scholar: b. Fitzroy Harbour, Ontario, 5 March 1855. He was graduated at McGill University, Montreal, 1880, and took his Ph.D. degree at Leipzig 1886. He was instructor and professor of Biblical languages in Lane Theological Seminary, 1886–90; professor of Old Testament literature and exegesis, Oberlin Theological Seminary, 1891; and, from 1893 to 1912 was professor of Semitic languages and Hellenistic Greek in the University of Michigan. He has published 'Inscriptions of Salmanassar, King of Assyria, 859–826 B.C.' (1887); 'Hebrew Word Manual' (1890); 'Assyrian and Babylonian Religious Texts' (1895–97); 'Astronomical-Astrological Texts of the Babylonians' (1899). He edited the Semitic Series of Handbooks and translated and edited Winckler's 'Geschichte Babylonians.' He has also contributed articles to many philological journals.

CRAIG, Sir James Henry, English soldier and administrator: b. Gibraltar 1748; d. London, 12 Jan. 1812. He entered the army in 1763, became captain of the 47th Foot in 1771, came to America in 1774, was wounded at Bunker Hill, was transferred with the 47th to Canada, and distinguished himself in the early part of Burgoyne's advance upon Saratoga. Made major of the 82d, he sailed for Nova Scotia; in 1781 fought in North Carolina; and was promoted successively lieutenant-colonel of the 82d and colonel of the 16th. In 1794 he became adjutant-general to the army in the Netherlands and was promoted major-general. On the conclusion of the war in the Netherlands, he was appointed to command a force to co-operate with the army from India in the capture of the Dutch colony at the Cape of Good Hope. The colony surrendered to him 14 Sept. 1795. He was governor at the Cape in 1795–97, and from 1797 to 1802 was in India. Having been promoted lieutenant-general in 1801, he commanded the troops in Italy and Sicily in 1805–06, operating in conjunction with the Russians against the French. In 1807 he was made local general in America, and captain-general and governor-general of Canada. The French were not well disposed toward the British government, and there were perpetual contentions in the assembly. Craig dismissed two assemblies and he suppressed *Le Canadien* newspaper. He resigned the government in October 1811, and in 1812 was promoted general.

CRAIG, John, Scottish preacher of the Reformation: b. Aberdeenshire 1512; d. Edinburgh, 12 Dec. 1600. He was educated at Saint Andrews, entered the Dominican Order, but soon fell under the suspicion of heresy and was cast into prison. On his release (1536) he traveled on the Continent, and after sometime was, through Cardinal Pole's influence, made novice master in the Dominican convent at Bologna and later was rector. While here Calvin's 'Institutes' fell in his way and converted him to Protestant doctrines. He was brought before the Inquisition and sentenced to be burned — a fate from which he was saved by the mob, on the death of Pope Paul IV, breaking open the prisons of Rome. Craig escaped to Vienna and obtained favor at the court of Maximilian II, but the Pope demanded his surrender as one condemned for heresy. The emperor, however, instead of complying with the request, gave Craig a safe-conduct out of Germany. He now returned to Scotland (1560) and was appointed the colleague of John Knox in the parish church of Edinburgh. Thinking the marriage of Queen Mary and Bothwell contrary to the word of God, he boldly refused to proclaim the banns, but afterward yielded under protest. In 1572 Craig was sent to Forfarshire until 1579, when he was appointed chaplain to King James VI. He now took a leading part in the affairs of the Church, was the compiler of part of the 'Second Book of Discipline,' and the writer of the national covenant signed in 1580 by the king and his household. He was a man of great conscientiousness and was not slow to oppose the proceedings of the court when he deemed them contrary to Scripture and to speak wholesome but unpleasant truths to majesty itself. Consult the black-letter facsimile reprint of Craig's 'Catechisms' (Edinburgh 1885), with introduction by T. Graves Law.

CRAIG, Katherine L., American educator: she was educated in the Colorado public schools and at Missouri Valley College. She was elected superintendent of public instruction of Colorado in 1904, re-elected 1906, and became field secretary of the Colorado Women's College in 1909. She codified and annotated the school laws of Colorado; compiled Arbor Day, Washington and Lincoln Day and Flag Day books for use in the public schools and takes an active part in all movements for the political and educational progress of Colorado. She also published 'Primary Geography' and a novel 'Judge Greyburn and Kathlene Lee.' She is a contributor to 'Teachers and Pupils' Cyclopedia'; 'New Students' Reference Work' and the *Woman's Athenæum*.

CRAIGHILL, krāg'il, William Price, American military engineer: b. Charlestown, Va., 1

July 1833; d. 18 Jan. 1909. He was graduated at West Point 1853; superintended the building of Fort Sumter 1854–55; built the defenses of Pittsburgh 1863; and on 13 March 1865 was brevetted lieutenant-colonel for faithful and meritorious services. Later he was employed on the defenses of New York and Baltimore, and in the improvement of navigation of southern rivers. He became brigadier-general and chief of engineers 10 May 1895, and was retired 1897. His publications include an ‘Army Officer's Pocket Companion’ (1862); and a translation of Dufour's ‘Cours de tactique’ (1863).

CRAIGIE, Pearl Mary Teresa Richards (“John Oliver Hobbes”), English novelist and dramatist: b. Boston, Mass., 3 Nov. 1867; d. London, England, 13 Aug. 1906. She was educated in Paris and London, married R. W. Craigie in England in 1887 and was divorced from him in 1895. Her vivid and picturesque style, acuteness of observation and caustic humor made her a favorite with discerning readers. Her writings include ‘Some Emotions and a Moral’ (1891); ‘The Sinner's Comedy’ (1892); ‘A Study in Temptations’ (1893); ‘A Bundle of Life’ (1894); ‘Journeys End in Lovers Meeting’; ‘The Gods, Some Mortals and Lord Wickenham’ (1895); ‘The Herb Moon’ (1896); ‘School for Saints’ (1897); ‘Osbern and Ursyne,’ a blank verse tragedy (1899); ‘The Ambassador,’ a play (1898); ‘The Serious Wooing’ (1901); ‘Love and the Soul Hunters’ (1902); ‘Robert Orange’ (1902); ‘The Flute of Pan,’ a drama (1905); ‘The Dream and the Business’ (1906).

CRAIK, crāk, **Dinah Maria**, best known as “Miss Mulock,” English novelist: b. Stoke-upon-Trent, 20 April 1826; d. Shortlands, Kent, 12 Oct. 1887. In her 23d year she published her first novel, ‘The Ogilvies.’ This was followed by ‘Olive’ (1850); and ‘Agatha's Husband’ (1853); but it was with the story of ‘John Halifax, Gentleman’ (1857) that she gained and retained her reputation as a novelist. This work has had an extraordinary popularity, having been translated into French, German, Italian, Greek and Russian. She published in all about 20 stories, among which were ‘A Life for a Life’ (1859); ‘Mistress and Maid’ (1863); ‘A Noble Life’ (1866); ‘Hannah’ (1871); ‘The Little Lame Prince’ (1874), etc. Besides these she was the author of a great number of essays on various subjects, such as ‘Sermons Out of Church’ (1875); ‘Plain Speaking’ (1882). She published a volume of poems in 1859, reissued with additions in ‘Poems of Thirty Years’ (1881). Among these ‘Douglas, Tender and True’ and ‘Philip My King’ have been widely popular. In 1864 she was married to George Lillie Craik, a nephew of the professor of the same name. The chief characteristic of her literary work was its refined optimism, and its success with the public was largely due to simplicity of diction.

CRAIK, George Lillie, Scottish miscellaneous writer: b. Fifeshire 1798; d. Belfast, Ireland, 25 June 1866. He removed to London in 1826, became a contributor to the Penny Cyclopædia in the departments of history and biography, but his first independent work of any importance was his ‘Pursuit of Knowledge under Difficulties.’ This was succeeded by his ‘Romance of the Peerage’; ‘Spenser and his Poetry’; ‘History of Literature and Learning in England’; ‘History of British Commerce’; ‘English of Shakespeare’; ‘Bacon, His Writings and Philosophy,’ etc. In 1849 he was appointed professor of English literature in Queen's College, Belfast, an appointment which he held till his death.

CRAIK, Georgianna Marian. See May, Georgiana Marian.

CRAIK, Sir Henry, Scottish educationist: b. Glasgow, 18 Oct. 1846. He was educated at Glasgow University and Balliol College, Oxford, and was secretary of the Scotch Education Department 1885–1904. He was created K.C.B. in 1897 and has represented Glasgow and Aberdeen Universities in the House of Commons since 1906. He is the author of ‘Life of Jonathan Swift’ (1882); ‘The State and Education’ (1883); ‘A Century of Scottish History’ (1901); ‘Impression of India’ (1908).

CRAIK, James, American psysician: b. Scotland 1731; d. Fairfax County, Va., 6 Feb. 1814. He came to Virginia early in life, and on 7 March 1754 was commissioned as an army surgeon. In 1755 he was a surgeon in Braddock's army and took part in the memorable action on the Monongahela. After serving through the French war in the Virginia regiment he settled as a physician near Mount Vernon, and finally at Alexandria. During the Revolution he was in the medical department. He took a prominent part in the disclosure of the plot to remove Washington from command during the winter at Valley Forge and was present at the surrender of Lord Cornwallis at Yorktown. He was Washington's family physician, and ever associated with him on terms of the closest friendship, attending him in his last illness, and being affectionately mentioned in Washington's will as “my compatriot in arms and old and intimate friend” to whom he bequeathed his tambour secretary and the circular chair, “an appendage of my study.”

CRAILSHEIM, or **KRAILSHEIM**, krīls'-hīm, Germany, town of Württemberg, on the Jagst, 47 miles northeast of Stuttgart. It contains three handsome churches, a town hall, extensive tanneries, machine shops, lumber yards, etc. It has also a large trade in cattle and farm products. It was incorporated in 1338, was ceded to Prussia in 1791, to Bavaria in 1806 and to Württemburg four years later. Pop. 6,100.

CRAIOVA, or **KRAJOVA**, krä-yō'vä, Rumania, capital of the province of Doljiu, on the river Jiu, 112 miles west of Bucharest. It is the chief commercial centre west of Bucharest and has a very extensive trade in the live stock and agricultural produce of the surrounding fertile district. It has rope and carriage factories, tanneries, military and commercial academies and several churches. It is the headquarters of the First Army Corps. In Roman days it was known as Costra Nova and in the Middle Ages was the capital of Lower Wallachia. Pop. 45,700.

CRAKE, or **CORN CRAKE**, English name for the landrail (Crex Crex), formed in imitation of its cry “crake, crake,” which is heard everywhere in valleys and low grounds in Great Britain and Ireland in early summer. It is reddish-brown in color, with streaks of a darker brown along the middle of its feathers. The under parts of its body are of a light brown.

CRALLÉ, Richard K., American author: b. South Carolina; d. Virginia, 10 June 1864. He was a relative of John C. Calhoun (q.v.), who employed him as his confidential clerk and amanuensis when he was Secretary of State. He had previously been an editor and Swedenborgian clergyman in Washington. He published 'Works of John C. Calhoun, with a Memoir' (6 vols., New York 1853–56) and several polemical works on New-church doctrines.

CRAM, Ralph Adams, American architect and author: b. Hampton Falls, N. H., 16 Dec. 1863. He was educated at Exeter, N. H., and Westford, Mass. He has practised as an architect since 1889. As senior member of the firm of Cram & Ferguson he helped to plan some of the most notable academic and ecclesiastical buildings in the United States. Among these are Graduate College and Cleveland Tower, Princeton University; Rice Institute, Houston, Tex.; Saint Alban's Cathedral, Toronto, Canada; Saint Thomas's Church, New York; Calvary Church, Pittsburgh; Euclid Avenue Presbyterian Church, Cleveland, Ohio. He became consulting architect for the cathedral of Saint John the Divine, New York, and, in 1914, professor in Massachusetts Institute of Technology. His writings include 'Church Building' (1901); 'The Ruined Abbeys of Great Britain' (1905); 'Impressions of Japanese Architecture and the Allied Arts' (1906); 'The Gothic Quest' (1907).

CRAM, William Everett, American author: b. Hampton Falls, N. H., 22 June 1871. He is a brother of Ralph Adams Cram (q.v.). He has written 'Little Beasts of Field and Wood' (1899); 'More Little Beasts' (1901); and, in collaboration with Witmer Stone, 'American Animals; Guide to the Mammals of North America North of Mexico' (1902); 'More Little Beasts of Field and Wood' (1912).

CRAMBE. See SEA-KALE.

CRAMP, Charles Henry, American shipbuilder: b. Philadelphia, Pa., 9 May 1828; d. there, 6 June 1913. He was graduated at the Central High School of his native city, and entered the shipyards of his father, William Cramp. He soon established the prestige of the firm of William Cramp & Sons, which he incorporated and of which he became president. Their shipyards in Philadelphia are the most extensive in the United States, executing contracts for the governments of the United States, Russia, Japan, Argentina, Chile, etc., and exercising a great influence upon modern naval development. He built ironclads and monitors for the United States government in the Civil War and assisted in the reconstruction of the United States navy and the re-establishment of the United States merchant marine. The destroyed battleship *Maine* was built at the Cramp yards, in whose 31 acres of ground nearly 6,000 workmen are employed. Consult Buell, 'Memoirs of C. H. Cramp' (New York 1906).

CRAMP, acute, painful sensations usually located in a voluntary muscle. It is a form of local clonic spasm in the muscle and may be due to one of several causes, the most important of which, however are over-exertion with consequent tire and cold, or it may result from organic disease. Cramps occurring in hollow viscera where there is much involuntary muscular tissue are usually termed colic (q.v.). The muscles most often affected are those of the extremities, especially those of the lower extremities. In the cramps which result from occupation, neuroses, such as occur in telegraphers, typewriters, violinists, musicians, etc., the upper extremities are involved. These cramp-like pains are distinctly of mental origin. The treatment of general forms of cramp is by means of warmth, massage; bromides and camphor are sometimes useful. Sudden putting of the muscle on vigorous stretch oftimes will relieve cramp. Cramps attacking swimmers are particularly difficult to handle, but if the presence of mind of the swimmer is not lost, turning on the back and floating may prevent drowning.

CRAMPTON, Charles Albert, American chemist: b. Davenport, Iowa, 18 Feb. 1858; d. Washington, D. C., 26 July 1915. He was graduated at the University of Michigan in 1882; was assistant chemist in the United States Department of Agriculture 1883–90; and after 1890 chief chemist of the Internal Revenue Bureau. In 1910 he became chief of the division of food and drug products. He carried out a number of investigations in agricultural chemistry and published memoirs and reports on special topics of the chemistry of food and agricultural products, including the composition of plant tissues, the composition of butter and other fats, etc. His writings include 'Record of Experiments at Des Lignes Experiment Station, Baldwin, La., 1888' (1889); 'Baking Powders' (Part V of Food and Food Adulterations, Washington 1889).

CRAMPTON, Henry Edward, American zoologist: b. New York, 5 Jan. 1875. He was educated at the College of the City of New York and at Columbia College, where he was an assistant in biology in 1893–95, and to which, after one year as instructor in the Massachusetts Institute of Technology, he returned to be fellow, lecturer and instructor in zoology; adjunct professor in 1901–04, and thereafter professor. He was a member of scientific expeditions to the islands of the South Pacific Ocean in 1906, 1907, 1908, 1909, and to British Guiana and the interior of Brazil in 1911, and to the Bahamas and Porto Rico 1912–15. In 1909 he was made curator of invertebrate zoology at the American Museum of Natural History, New York. He has published 'The Doctrine of Evolution' (1911); also various monographs on evolution, embryology, experimental zoology and travel.

CRAMPTON, Thomas Russell, English engineer: b. Broadstairs, Kent, 6 Aug. 1816; d. London, 19 March 1888. His engineering training was received under such men as the elder Brunel, Sir Daniel Gooch and John and George Rennie. Between 1842 and 1848 he made many improvements in locomotive machinery. In 1843 he designed and patented the engine which bears his name. «The characteristic features of the Crampton engine are a long boiler, outside cylinders set in the middle of the engine's length, and large driving wheels placed quite in the rear of the driving box.» In 1851 he laid the first practical submarine cable between Dover and Calais, his best piece of professional work. Among other works carried out either wholly or in part by him were the Berlin waterworks; the Smyrna railway; and the Varna railway. He also invented a rotary dust-fuel furnace, and an automatic hydraulic tunnel-boring machine. The outside fire-box shells on many modern engines are still known as Crampton's.

CRAMPTON'S GAP, Battle of. See South Mountain, Battles of.

CRANACH, krä'näн, **KRANACH,** or **KRONACH, Lucas,** The Elder, German painter and engraver, founder of the Saxon school: b. Kronach, Ger., 1472; d. Weimar, 16 Oct. 1553. His family name is said to have been Müller, and the name by which he afterward called himself is said to have been taken from his birthplace. In 1504 he became court painter to Frederick the Wise, Elector of Saxony, and in 1508 he was ennobled. In 1509 he traveled through the Netherlands and at Malines painted the portrait of the future Emperor Charles V, then a child of nine years. In 1519 he was elected chairman of the town council; he became burgomaster in 1537 and again in 1540. He was the intimate friend of Luther, of whom he painted various portraits, several of them still extant. After the death of the Elector Frederick he still remained attached to the Saxon court, for he received as much favor from Frederick's successors — John the Constant and John Frederick the Magnanimous. Cranach's portrait of the latter is contained in the New York Metropolitan Museum. After the battle of Mühlberg, in 1547, in which John Frederick was taken prisoner by the troops of Charles V. Cranach showed his attachment for his master by following him from prison to prison until in 1552 he was set at liberty, when he returned with Cranach at his side to Weimar. He engraved both on copper and wood, and also illuminated manuscripts, and was remarkable for his rapidity of execution. His smaller cuts are by far superior in drawing and detail. He devoted many of his engravings to subjects of value to the Reformation. His work was original, realistic and rich in its nationalism. He painted a large number of Madonnas, perhaps the most celebrated of which are to be seen in the cathedral of Glogau and the Pinakothek of Munich. Another favorite subject with him was Christ blessing the little children, a good specimen of which is in the Baring collection in London. Perhaps the most beautiful of his paintings on this subject is contained in the city church of Naumburg. Of his larger religious paintings, good examples are the 'Marriage of Saint Catharine' in the cathedral of Erfurt, and his last great work in the town church at Weimar, 'The Crucifixion,' depicting the object of the Reformation, and introducing the figures of Luther and Cranach himself. He excels in portrait painting, but although these show a mastery of detail, they lack the great strength and spirit of the German masters. They have a dry uniformity, a false idea of elegance, which, added to his desire to amuse, heighten the comic effect. Among the best are 'Cardinal Albrecht of Mainz as Saint Jerome' in the Berlin Museum; 'John Frederick of Saxony,' and an 'Unknown Female' in the National Gallery, London. He painted many miniatures, as in the album of the University of Wittenberg, now at Halle, and especially in John Frederick's 'Book of Tourneys' now at Coburg, a work of 144 pictures. Consult Heller, 'Das Leben und die Werke Lucas Cranachs' (2d ed., 1844); Schuchardt, 'Lucas Cranach des älteren Leben und Werke' (1851–61); Dodgson in 'Bibliothèque des bibliographies critiques' (Paris); Fleschig, 'Tafelbilder Lucas Cranaches die Alteren; Cranach Studien' (Leipzig 1900); and the monographs by Warnecke (Görlitz 1879); Lindau (Leipzig 1883); and Michaelson (ib. 1902).

CRANACH, Lucas, The Younger, German painter: b. 4 Oct. 1515; d. 25 Jan. 1586; second son and a pupil of Lucas Cranach, whose manner he copied so faithfully that many of his father's works are assigned to the son. Moreover, each used a similar mark, a crowned serpent with wings. According to Schuchardt, the son varied his mark by showing the wings of the serpent folded instead of erect, as in the pictures signed by the father. His 'Crucifixion' and 'The Lord's Vineyard,' symbolical of the progress of the Reformation, are in the Stadt Kirche at Wittenberg. Other pictures of his may be found in Dresden, Berlin and Munich.

CRANBERRY, several trailing species of the family *Vacciniaceæ* genus *Oxycoccus*. One of these species, *O. marcrocarpus*, is extensively cultivated in the United States for its acid fruit which ripens in the autumn and may be kept until spring, and which finds an important culinary use in the making of sauce, pies, etc., but is never eaten as a dessert fruit. The crop of 1909 was reported to be 987,500 bushels, produced mainly in Massachusetts, New Jersey and Wisconsin, the balance being made up from smaller areas in the northern States. Though one of the species (*O. cxycoccus*) is a native of Europe as well as America, it has not developed European horticultural varieties. Indeed, in Europe the cranberry is cultivated to a much smaller extent than in America.

The two species from which the cultivated varieties have been derived are *O. oxycoccus*, the smaller cranberry, and *O. macrocarpus*, the larger cranberry. Both are natives of northern swamps and marshes, especially such as are rich in peat; the latter species is confined to North America. Both are trailing vines bearing small evergreen leaves, inconspicuous flowers and globular or pyriform red fruits borne on slender curved stalks, which suggested the name *crane-berry* — the neck of a crane. The American species is cultivated almost exclusively and has developed the larger number of horticultural varieties, but the smaller cranberry is considered by many to produce finer flavored fruits. The general types of berries are globular, bell-shaped and bugle-shaped, with numerous varieties in each class.

Commercially, cranberries are grown in low, wet ground, though they are sometimes raised upon drier soils. The land selected must be drained, so that standing water will be at least a foot below the surface of the soil during summer; it must be retentive of moisture, since the plants quickly suffer in dry seasons; it must be level in order to be readily flooded in very dry weather, in winter, and when insects are seriously troublesome; it must be situated where injury from frosts will be as little as possible. Late spring frosts injure the blossoms; early autumn ones, the fruit. Further, there must be sufficient water to quickly flood the field. Bogs in which sphagnum moss grows upon a peat or muck soil are preferred and are considered specially promising if plants related to the cranberry grow naturally upon the land. Draining the bog and clearing it of trees, brush, roots, moss, etc., is followed by the digging of permanent open ditches two to four feet deep. These spread the water and remove it in times of flooding, etc. After the land is prepared it is usually covered with a few inches of sand to keep down weeds and thus reduce the cost of maintenance. In this sand cuttings six or eight inches long are set at intervals of from 12 to 15 inches apart each way. Beyond the removal of weeds no cultivation is generally given. The third or fourth year a full crop may be expected; 50 barrels being a good yield, though four times that amount has been obtained. When the beds become too full of vines they are mown or burned over to start a fresh growth and every fourth or fifth year a fresh covering of an inch or so of sand is given. Sanding is not practised in some localities. The cost of preparing and planting a bed as above indicated varies from $300 to $500 an acre. Harvesting is done by hand when highest grades are picked; by raking and combing for the less choice.

Several diseases and insects attack the cranberry. Of the former the most serious is probably the scald, which appears most frequently in hot muggy seasons as a soft reddish-brown spot on the fruit, which quickly swells and gets hard, but later shrivels and either drops off or remains attached to the vine. The leaves are also more or less affected. Spraying with bordeaux mixture is found to be the most satisfactory method of treatment. It is usually most easily done while the bed is flooded. Red galls are often troublesome upon the leaves. This is controlled by burning the beds over in the autumn to kill the spores of the fungus. A large and conspicuous distortion and reddening of the green parts may sometimes prove destructive. The leading insect enemies are two caterpillars, one of which attacks the foliage, the other the fruit. The former, known as the black-headed fireworm, may be controlled by the application of kerosene or Paris green. The latter, a kind of span-worm, may be destroyed by spraying with an arsenite when the leaves are falling and the fruit is setting. Generally, perhaps, the beds are flooded to destroy these and other insect pests.

Several other plants bear the name cranberry. Among the best known are *Vaccinium vitis-idæa,* known as low bush cranberry, wolf-berry, mountain cranberry and cowberry. It is a native of Europe and America and is often found in the markets, but is not cultivated. Its fruits reach American markets not only from the northern United States and eastern Canada, but often from Norway, Sweden, Denmark and Germany. The high-bush, high cranberry or cranberry-bush is a shrub, a species of *Viburnum,* which attains a height of 12 feet and bears scarlet berries which persist during winter. The fruit is scarcely edible. This plant is the original species from which the snowball has been developed. In both forms it is a very attractive and popular ornamental shrub.

Bibliography.— Bailey, ‘Standard Cyclopedia of Horticulture’ (New York 1914); White, ‘Cranberry Culture’ (New York); Webb, ‘Cape Cod Cranberries’; Special Bulletin *K,* New Jersey Experiment Station, ‘Insects Injuriously Affecting Cranberries’; ‘Proceedings of the American Cranberry Growers’ Association.’

CRANBROOK, Gathorne Gathorne-Hardy, 1st EARL, English statesman: b. Bradford, 1 Oct. 1814; d. Hemsted Park, 30 Oct. 1906. In 1865 he defeated Mr. Gladstone in the celebrated Oxford University election; in 1878 he was raised to the peerage as Viscount Cranbrook. He was Under-Secretary of State for the Home Department (1858–59), president of the Poor-law Board (1866–67), Home Secretary (1867–68), War Secretary (1874–78), Secretary of State for India (1878–80) and Lord President of the Council (1885, 1886–92).

CRANBROOK, Canada, town of British Columbia, in the Kootenay Valley between the Selkirk and Rocky mountains, on the Canadian Pacific Railroad, 35 miles west of Fernie. It contains the provincial buildings, a high school, manual training school, several primary schools and churches. It has extensive agricultrual and mining interests and is an important trade centre. Its manufactures include brick yards, mineral water works, iron foundries, planing mills and sash and door factories. Pop. 3,090.

CRANCH, Christopher Pearse, American artist and poet: b. Alexandria, Va., 8 March 1813; d. Cambridge, Mass., 20 Jan. 1892. He was a son of William Cranch (q.v.). He studied at Columbian University, Washington, D. C.; was graduated at the Harvard Divinity School 1835; preached in Unitarian pulpits for a few years, and then gave himself up entirely to painting and poetry. He studied in Italy 1846–48, 1853–63, when he returned to America and was elected a member of the National Academy, but exhibited nothing after 1871. He was an intimate friend of Lowell and Longfellow; a man of versatile if not commanding talent; and one whose friendship was highly cherished by the few favored with it. Some of the best known of his paintings are ‘Val de Moline, Amalfi, Italy’ (1869); ‘Venice’ (1870); and ‘Venetian Fishing Boats’ (1871). His well-known poem ‘Thought’ appeared in *The Dial* (1840). His published works include ‘Poems’ (1844); ‘The Last of the Huggermuggers’ (1856); ‘Kobboltozo’ (1857); a blank verse translation of the ‘Æneid’ (1872); ‘Satan: a Libretto’ (1874); ‘The Bird and the Bell, and Other Poems’ (1875; 2d ed., 1890); ‘Ariel and Caliban’ (1887).

CRANCH, William, American jurist: b. Weymouth, Mass., 17 July 1769; d. Washington, D. C., 1 Sept. 1855. He was graduated at Harvard in 1787; admitted to the bar in 1790; appointed an associate judge of the United States Circuit Court for the District of Columbia in 1801; and chief justice of that court in 1805. He held this office till his death, and during a period of over half a century had only two decisions overruled by the Supreme Court. His reports of cases decided in the Circuit Court (1801–41) were published in six volumes; and those of the United States Supreme Court (1801–15) in nine volumes, with supplementary issues in 1835.

CRANDALL, Charles Henry, American writer: b. Greenwich, N. Y., 19 June 1858. He was for five years on the staff of the New York *Tribune,* and in book form has published 'The Season; a Social History of New York' (1883); 'Representative Sonnets' (edited, 1891); 'Wayside Music' (1893); 'The Chords of Life' (1898); 'Songs from Sky Meadows' (1909), the last three being volumes of poems. Mr. Crandall was selected to read the poem at the dedication of the Battle Monument at Saratoga (where Burgoyne surrendered). He contributes essays on social subjects and country life, poems, etc., to leading periodicals.

CRANDALL, Charles Lee, American civil engineer: b. Bridgewater, N. Y., 20 July 1850. He was graduated from Cornell University in 1872 and has been connected with that institution as instructor and professor of engineering from 1874. He has published 'Tables for Computation of Railway and Other Earthwork' (1886); 'Notes on Descriptive Geometry' (1888); 'Notes on Shades, Shadows and Perspective'; 'The Transition Curve' (1893); 'Textbook on Geodesy and Least Squares' (1907); 'Field Book for Railroad Surveying' (1909); and is joint author of 'Railroad Construction' (1913).

CRANDALL, Prudence. See PHILLEO, PRUDENCE CRANDALL.

CRANE, Bruce, American landscape artist: b. New York, 17 Oct. 1857. He studied art in New York city and in Paris, France, and made his first exhibition of pictures at the National Academy of Design in 1879. He gained the Webb and the Saltus prizes; was awarded the bronze medal of the Paris Exposition in 1900; the silver medal of the Pan-American Exposition in 1901; the silver medal of the Carolina Exposition, the gold medal of the National Academy and the gold medal of the Louisiana Exposition in 1904; and the silver medal of the Panama-Pacific Exposition in 1915. He was elected a member of the National Academy of Design in 1901. Among his notable pictures are 'The Hills' in the National Academy; 'March' in the Brooklyn Museum; 'Autumn Uplands' in the Metropolitan Museum; and 'Springtime' in the Peabody Institute, Baltimore.

CRANE, Frank, journalist and author: b. Urbana, Ill., 12 May 1861. He studied at the Illinois Wesleyan University and was ordained to the Methodist Episcopal ministry in 1882. He received from his alma mater the honorary degree of Ph.B. in 1892 and D.D. from Nebraska Wesleyan University in 1894. He held the pastorates of two Chicago Methodist Episcopal churches 1896–1903; and of the Union Congregational Church, Worcester, Mass., from 1904 until in 1909 he resigned to devote himself to journalism. As editorial writer for *The Associated Newspapers,* the syndicate of 40 newspapers in the leading cities of the nation, and as a contributor to leading magazines, his essays treating with the daily problems of life are written in a popular vein and are marked by versatility, shrewd and kindly philosophy. Collected in book form these essays are widely read throughout America and the English-speaking world under the following titles: 'The Religion of To-Morrow' (1899); 'Vision' (1907); 'The Song of the Infinite' (1909); 'Human Confessions' (1911); 'God and Democracy' (1911); 'Lame and Lovely' (1912); 'Footnotes to Life' (1913); 'War and World Government' (1915); 'Just Human' (1915); 'Adventures in Common Sense' (1916); 'The Looking Glass' (1917); 'Christmas and the Year Round' (1917); 'Lighted Windows' (1918).

CRANE, Frank, American illustrator and cartoonist: b. Rahway, N. J., 1856; d. New Rochelle, N. Y., 26 Oct. 1917. He was a descendant of Sir Peter Crane, and his ancestors founded the town of Crane's Ford, now Cranford, N. J. Crane was graduated from the New York Academy of Design, and became successively cartoonist and art editor of the *New York World,* and later art editor of the Philadelphia *Press.* He was subsequently connected with the New York papers, the *Times, Herald* and *Tribune,* and the Boston *Herald.* He was a cousin of Mr. Stephen Crane, the author. Among his humorous creations are "Uncle Dick's Contraptions"; "Muggsy" and "Willie Westinghouse Smith." He also wrote several boys' stories.

CRANE, Ichabod, the country schoolmaster in Irving's 'Legend of Sleepy Hollow,' in the 'Sketch Book' who was frightened away from the Hollow by his adventure with the Galloping Hessian.

CRANE, Stephen, American novelist and poet: b. Newark, N. J., 1 Nov. 1870; d. Badenweiler, Germany, 5 June 1900. After receiving his education at Lafayette College and at Syracuse University, he began as a reporter and newspaper writer; was correspondent for the New York *Journal* in the Greco-Turkish War 1897 and in Cuba for the Spanish-American War. 'The Black Riders and Other Lines' (1895), a collection of verse, was his earliest volume, followed by his 'Red Badge of Courage' (1896), which excited a widespread interest in its author and seemed to presage a career of more than ordinary brilliancy. His later works are 'Maggie: a Girl of the Streets' (1896); 'George's Mother' (1896); 'The Little Regiment' (1897); The Third Violet' (1897); 'The Open Boat' (1898); The Eternal Patience' (1898); 'Whilomville Stories' (1900); 'Wounds in the Rain' (1900); 'Great Battles of the World' (1901). In 1903 appeared 'O'Ruddy' written in collaboration with Robert Barr.

CRANE, Thomas Frederick, American scholar: b. New York, 12 July 1844. Graduated A.B. at Princeton College in 1864 and became a professor of the Romance languages at Cornell University on its opening in 1868. For 13 years, 1896 to 1909, he was dean of the College of Arts and Sciences and of the university faculty, and in 1899 and 1912 was acting president. He retired under the provision of the Carnegie Foundation in 1909. He has contributed to periodicals articles on Folk Lore and Mediæval Latin Fiction, and has written the following works: 'Tableaux de la Révolution Française' (1884); 'Le Romantisme Français' (1886); 'La Société Française au dix-septième siècle (1889); 'Boileau's les Héros de Roman' (1902); 'Rotrou's Saint Genest and Venceslas' (1907); 'Chansons populaires de la France' (1891); 'Italian Popular Tales' (1885); 'The

Exempla or Illustrative Stories from the Sermons of Jacques de Vitry’ (1890).

CRANE, Walter, English artist and writer: b. Liverpool, 15 Aug. 1845; d. 14 March 1915. He became apprentice to W. J. Linton, the well-known wood engraver, in 1859, and soon began to illustrate books. In 1888 he became first president of the Arts and Crafts Society. In the following year he became associate of the Royal Society of Painters in Water Colors, and from 1893 till 1896 was director of design in the Manchester Municipal School of Art. His principal publications were ‘Picture Books’ (1865–76); ‘Baby's Opera’ (1877); ‘Grimm's Household Stories’ (1882); ‘The First of May’ (1883); ‘The Sirens Three: a Poem’ (1885); ‘Flora's Feast’ (1889); ‘Queen Summer’ (1891); ‘Renascence’ (1891); ‘Claims of Decorative Art’ (1892); ‘Decorative Illustrations of Books’ (1896); ‘Spenser's Faerie Queene’ (1895–97); and ‘Shepherd's Calendar’ (1897); ‘The Bases of Design’ (1898); ‘Line and Form’ (1900); ‘Don Quixote’ (1900); ‘A Masque of Days’ (1901); ‘An Artist's Reminiscenses’ (1907); ‘India Impressions’ (1907), etc. Among his pictures are ‘Renascence of Venus’ (1877); ‘Fate of Persephone’ (1878); ‘Europa’ (1881); ‘The Bridge of Life’ (1884); ‘Freedom’ (1885); ‘La Belle Dame Sans Merci,’ ‘England's Emblem’ (1895); ‘The Rainbow and the Wave’ (1896); ‘Britannia's Vision’ (1897); the ‘World's Conquerors’ (1898); ‘Mask of the Four Seasons’ (1905) and ‘Prometheus Unbound.’ Mr. Crane belonged essentially to the imaginative and poetic school so prominent among recent artists. He was identified with the Socialist movement as lecturer, writer and artist.

CRANE, William Henry, American actor: b. Leicester, Mass., 30 April 1845. He was educated in the Boston schools. In 1863, after some amateur experience, he made his début at Utica, N. Y., with the Holman Opera Company, taking the part of the notary in Donizetti's ‘Daughter of the Regiment.’ In 1870 he became a member of the Alice Oates Company, with which he remained for four years. In 1874 he played at Hooley's Theatre in Chicago, filling the leading comedy rôles, and later he acted in San Francisco. Returning East, he made his first marked success with Stuart Robson (1877), at the Park Theatre, New York, in Grover's farcical play, ‘Our Boarding House.’ Among their other successes were those in the ‘Comedy of Errors’ and ‘The Henrietta’ (1889), after which he separated from Mr. Robson. His subsequent plays include ‘The Senator’; ‘The American Minister’; ‘On Probation’; ‘A Fool of Fortune’; ‘A Virginia Courtship’; ‘David Harum’ (1900); ‘Business is Business’ (1905); ‘She Stoops to Conquer’ (1906–07); ‘Father and the Boys’ (1907); ‘The Senator Keeps House’ (1911); and a revival of Bronson Howard's ‘Henrietta,’ rewritten and produced as ‘The New Henrietta’ (1914).

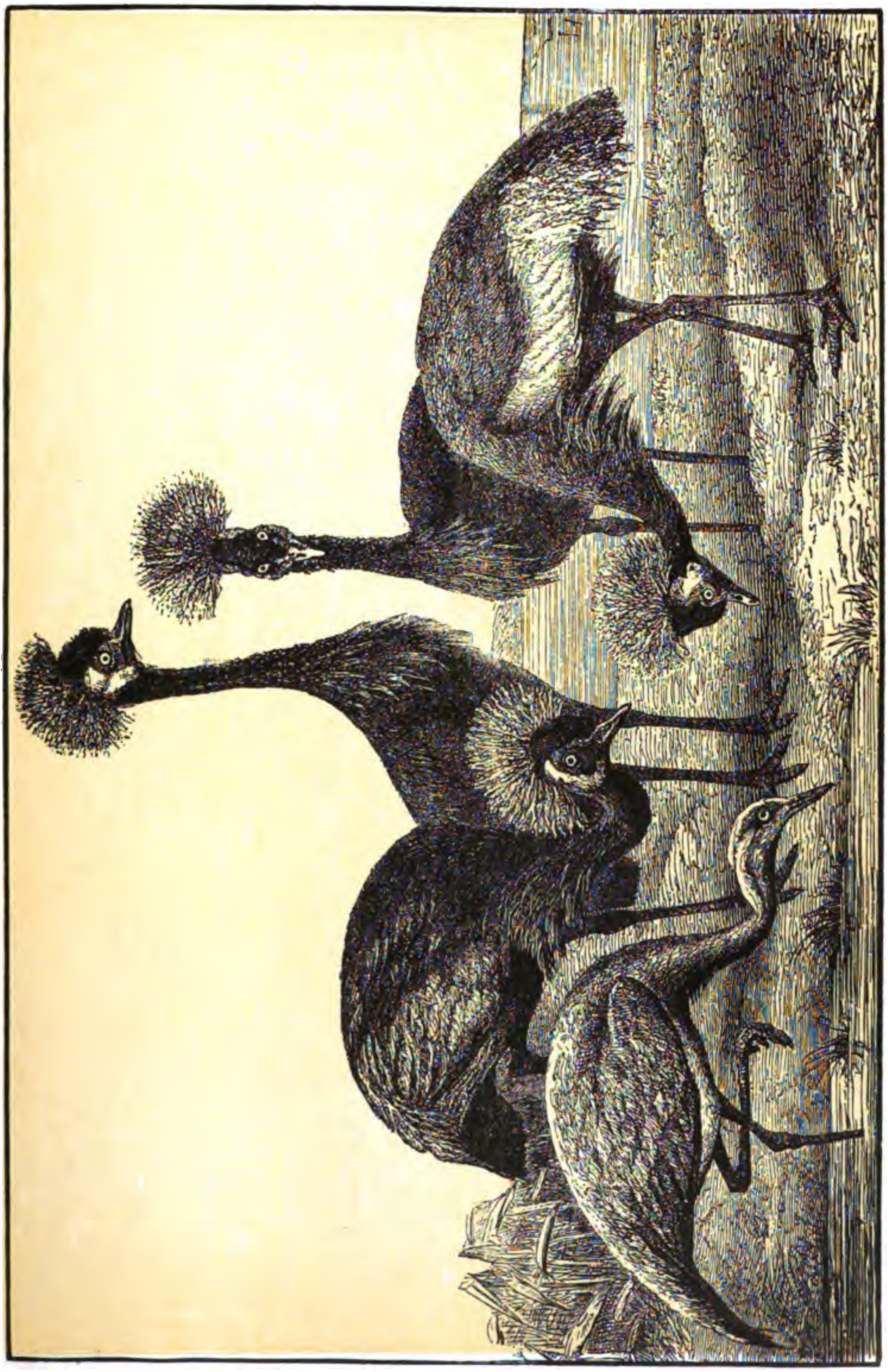
CRANE, Winthrop Murray, American paper manufacturer: b. Dalton, Mass., 27 April 1853. He was lieutenant-governor of Massachusetts 1897–99, and governor of the State 1900–02. In 1901 he was offered, but declined, the position of Secretary of the Treasury. In 1904, upon the death of Senator Hoar, he was appointed to the Senate, in 1905 elected to fill his unexpired term, and in 1907 for the full term ending in 1913, when he retired from public life.

CRANE, a large wading-bird of the extensive and cosmopolitan family *Gruidæ*. Cranes are often confused with herons, but really are related to the rails. The typical and most widely known species is probably the common crane (*Grus communis*) of Europe and northern Asia, which has long figured in literature and legendary history. Cranes are large birds, the biggest, as for example our whooping crane, holding its head, when erect, nearly as high as that of a man; but this height is mainly owing to the long neck which eminently fit them for living in marshes and situations subject to inundations, where they usually seek their food. This is principally of vegetable matter, consisting of the seeds of various plants or grains plundered from grounds recently plowed or sown. They also devour insects, worms, frogs, lizards, reptiles, small fish and the spawn of various aquatic animals. They build their nests among bushes or on tussocks in the marshes, constructing them of rushes, reeds, etc., surmounted by some soft material. They lay but two eggs, which are buff, gray or greenish in ground-color and variously marked with darker spots. These birds are said to mate for life.

The cranes annually migrate and perform journeys astonishing for their great length and hazardous character, transporting themselves from the tropical heat of southern India and central Africa to the icy waters of Lapland and Siberia and from Arctic America to the tropics. They are remarkable for making numerous circles and evolutions in the air when setting out on their journeys, and generally form two lines meeting in an angle forward, led by one of the strongest of their number, whose trumpet-like voice is heard as if directing their advance, when the flock is far above the clouds and entirely out of sight. To this call-note of the leader the flock frequently respond by a united clangor, which, at such a distance, does not produce an unpleasant effect. From the sagacity with which these birds vary their flight, according to the states of the atmosphere, they have, from the earliest ages, been popularly regarded as indicators of events; and their manœuvres were attentively watched and interpreted by the augurs and aruspices among the Romans — a circumstance which, together with their general harmlessness and apparent gravity of demeanor, led to their being held in a sort of veneration, even by some civilized nations. When obliged to take wing from the ground, cranes rise with considerable difficulty, striking quickly with their wings and trailing their feet along and near the ground until they have gained a sufficient elevation to commence wheeling in circles, which grow wider and wider until they have soared to the highest regions of the air. When their flight is high and silent, it is regarded as an indication of continued fine weather; they fly low and are noisy in cloudy, wet or stormy weather. Against approaching storms the cranes, like various other birds of lofty flight, readily guard by ascending above the level of the clouds and the atmospheric currents which bear them.

The North American cranes are three, the whooping or great white crane (*Grus Ameri-*

CRANES



The Crested Crane (Balearica pavonina)

The Demoiselle Crane (Grus virgo)

cana), pure white, with wing quills black and the top of the head dull red; the little brown crane (*G. Canadensis*), comparatively small and dull gray in plumage; and the sandhill crane (*G. Mexicana*). The first of these is almost extinct, even in the far northwest, and the second is growing rare in its subarctic summer home; but the larger, grayish sandhill crane is still fairly common in the Mississippi Valley and Gulf States. The genus contains many foreign species, some of which are celebrated, as the graceful "demoiselle" of southern Europe and eastward; the crowned crane of northeast Africa, whose head bears a spreading tuft of feathers and bristles larger than the head itself; the two-wattled cranes of South Africa; the "native companion" of Australia, and the national crane of Japan, called there "tan-cho," whose gray, black and white plumage and stately attitudes are familiar to us in the paintings and decorative designs of Japanese artists. Many of them are of large size and handsome plumage, although none wear bright colors. It is an ancient family, represented in fossils from the Miocene period onward. Consult Tegetmeier, 'Natural History of the Cranes' (London 1861); Evans, 'Birds' (New York 1900).

CRANE, a hoisting and transporting machine, consisting essentially of a central post on which is mounted rigidly a crosswise arm or jib; together with a winding apparatus and a device for rotating the entire structure upon a pivot or on a circular track. The jib is commonly supported at or near its outer end by a strut footed against the lower part of the post or by a tie to the top of the post. The jib is usually so arranged as to carry a traveler, by which the load may be transported toward or away from the post as the case may be. The crane differs from the derrick in that the latter has a boom hinged to the post instead of a jib rigidly attached. In the derrick-crane the jib and the post form one continuous structure, either curved or cranked, and this is hinged to the revolving base.

Cranes are of very many types, and the largest ones are quite individual in character and construction, as they are erected for particular uses. They may, however, be grouped into three general classes: Fixed cranes, portable cranes, and traveler cranes. Each of these classes is susceptive of subdivisions, depending upon their peculiarities of structure and the power used to operate them.

Fixed cranes, as their name implies, are built to operate in the place where erected, within a fixed radius. This class includes the common foundry or quarry crane, suitable for lifting and moving loads up to 10 or 15 tons, and often operated by hand; the whip cranes used in warehouses and commercial establishments, lifting up to five tons and operated by hand or electricity; the wall crane, built like a bracket pivoted against the face of a wall; and wharf cranes, erected substantially at the waterside — and often far inland — for loading and unloading the cargoes of vessels and of railroad trains. Some of these are of great power, lifting up to 100 tons. They are operated variously by steam or electricity or pneumatically with water or oil.

Portable cranes are also known as "balance cranes" because of the heavy weights which are placed on the "tail" of the smaller sizes to counterbalance the load. They are mounted on a truck with wheels to run on a track. This type is in common use by railroads for removing wreckage, and in bridge building and similar work. Instead of the counterbalancing weights, it is usual to mount the hoisting engine and machinery on the tail of the crane. For railroad work, the post and jib are commonly in one piece, and demountable for convenience in transportation. The operating power is steam or electricity. Frequently the machinery is so arranged as to make the crane self-propelling, and it is then called a locomotive crane.

Traveling cranes are of two general types: the overhead gauntry crane and the gauntry crane which runs on the ground. In the former a bridge-like structure runs on elevated tracks placed lengthwise of a yard or building, and on this bridge a traveler runs transversely, thus covering the entire space within the tracks. In small installations the motive power is often a chain worked by hand, but these cranes have been greatly elaborated, and electricity is generally used, though there are instances of the employment of compressed air and also pneumatic installations. In very large plants the traveler frequently carries a cargo in which the operator sits, controlling every motion from a switchboard. Some of these cranes employed in shipbuilding yards and locomotive works are of great power, handling a load of 100 tons with ease and speed. The gauntry cranes, which run on tracks laid on the ground, partake of the type seen in the portable crane in some cases, mounted on an elevated gauntry, the base of which is fitted with trucks to run on the tracks. Another type resembles the overhead traveler crane. Combination structures are numerous and various, including the cantilever crane, in which the jib is extended on both sides of the post into a long trussed arm of the cantilever type; the bridge crane, in which one end of the long jib is supported on a track running on an elevated rail, with a traveler running on this bridge arm; the Titan crane, often built upon a float for harbor use, with its long arm supported by several guys from the top of the tall mast; and the coal and ore "tips" for raising and emptying whole cars, operated generally by hydraulic power. For the multitude of specific details of construction and operation of these indispensable machines, consult Boettcher, A., 'Cranes' (Tolhausen's translation and additions, London 1908); Hill, C. W., 'Electric Crane Construction' (London 1911); Marks, E. C. R., 'The Construction of Cranes and Other Lifting Machinery' (Manchester 1904); Wilda, H., 'Cranes and Hoists: Their Construction and Calculation' (Salter's translation, London 1913).

CRANE-FLY, or DADDY-LONG-LEGS, species of *Tipula*, etc., of the dipterous family *Tipulidæ*. These flies are very common and known by their large size and long sprawling legs. They can usually be distinguished from midges and mosquitoes by their size, and always by a V-shaped mark on the back of the thorax. The antennæ are rather long and slender, and the hind-body long, slender and cylindrical. They possess a distinct ovipositor, with two pairs of long, horny, pointed valves. The larva is a footless grub, like a maggot, which lives under stones in brooks or in damp soil; its head is distinct, and in this respect the larva is more primitive and generalized than are those of most flies. It breathes by a pair of spiracles situated at the extremity of the body. There are many species of crane-flies in the United States.

CRANE'S-BILL, the common name of *Geranium*, the typical genus of the geranium family, *Geraniaceæ*, so named because of the long slender beak of the fruit of the plant. The genus has about 175 species, which are widely distributed throughout the temperate regions of the world, of which 16 are found in North America. The plants are mostly useless weeds, although some of them have very showy flowers. Other common names of American species are alum-root, herb robert, red robin, etc. See GERANIUM.

CRANEY ISLAND, an island in Norfolk County, Va., near the mouth of the James River. Here is situated a lighthouse 50 feet in height, standing on an iron pier, lat. 36° 53′ 28″ N.; long. 76° 21′ W. There are government powder magazines on the island.

CRANEY ISLAND, Battle of, 22 June 1813, in the War of 1812, a British fiasco. The island is at the mouth of Elizabeth River, Virginia, where it opens into Hampton Roads and lies close to the shore at the west, separated by a shallow strait and opposite a tidal creek. To guard the entrance to Norfolk, Portsmouth and the navy yard, a battery of seven guns had been placed on the island, with about 700 men, and 15 or 20 gunboats were anchored across the river channel. Admiral Warren ordered Sir Sydney Beckwith with 800 men to land on the mainland and take the island in rear, while Captain Pechell with 700 in barges landed on the island from the northwest, out of range of the gunboats. Beckwith came to the rear of the island, found the creek and strait too deep to risk fording — or according to Warren's report, the island was too strongly fortified to attack — and re-embarked without an effort, 40 men deserting. Pechell's boats grounded in shoal water some hundreds of feet from the island; the seamen sounded and found deep mud below; three of the barges were sunk by the American guns, and the American troops waded out to musket-range and fired at the marines, killing three and wounding 16, while 20 deserted to the Americans. The remaining boats took in their comrades and retired. There were no American losses.

CRANFORD. Not exactly a novel, Mrs. Elizabeth Gaskell's 'Cranford' was first published as a series of "sketches from life" in *Household Words*, a periodical which Dickens was editing. When the series came to an end in 1853 the sketches were collected and issued as a book. Mrs. Gaskell wrote with her memory upon Knutsford (renamed Cranford), a little country town in Cheshire, England, where she passed her childhood, where she later visited, and where she was married. And yet, though she drew freely from her recollections, her art required that she make many alterations in incident and character. Her Cranford is a town given over mostly to spinsters, who somehow manage to live in a genteel manner on small incomes inherited from a father or a mother dead long ago. A widow may be received into the society, but it is with some suspicion; and a retired army officer is welcome, provided he brings no wife. Rarely are there any marriages except among servants and shopkeepers. Mr. Hoggins, the doctor, manages to take Lady Glenmire, a newcomer, to the altar, but their conduct is frowned upon by the chaste ladies, one of whom, on retiring, always rolls a ball under her bed as a sure and easy means of detecting whether by chance a man lies concealed there to frighten her with "a great fierce face." The most exciting amusements are visits to the shops, little select parties at tea or at cards, and an occasional exhibition of a traveling juggler in the assembly rooms. A cow falls into a lime-pit and loses all her hair, and her feminine owner dresses her in "a flannel waistcoat and flannel drawers" to keep away the winter's cold. The literary lady cultivates her mind with the works of Dr. Johnson, and contends that 'Rasselas' far surpasses in humor anything in Mr. Dickens's 'Pickwick,' then just appearing in monthly numbers. There are, of course, no children, but the younger members of the best society find something to do in chasing sunbeams from a new carpet in order that it may not fade. If 'Cranford' has a central figure, it is Miss Matty Jenkyns, who should have married in youth Thomas Holbrook, Esq., and been made happy long ago. Both live into old age and die unmarried. It is a romance of subdued but rare pathos.

Mrs. Gaskell wrote novels of wider sweep than 'Cranford.' Her 'Mary Barton,' for example, dealing with the conflict between labor and capital, between the manufacturer and the operatives in his mill, made a profound impression upon the Europe of her day. But this and other novels, like 'North and South,' have lost the greater part of their interest because they are intimately bound up with social conditions which no longer exist and which the world is anxious to forget. 'Cranford' likewise depicts a state of society which has very few resemblances to anything that may be seen at present; but it is a society upon which intrude none of man's darker passions — no greed or avarice or distrust or treachery. Over a woman's world as it once was, with its small duties, anxieties, fears, moderate pleasures and respectable poverty, Mrs. Gaskell throws the glamour of her own delightful personality. Hers was a delicate humor, a true but not insistent pathos and a charming style.

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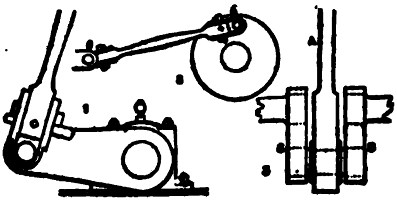
CRANGANORE, krăn-gă-nōr′ (*Corangalur*), India, a town in Hindustan, in the presidency of Madras, on the Malabar coast, lying north of a small bay, 16 miles north of Cochin. It has much historic interest, especially as one of the earliest seats of Christianity in India. Syrian Christians are said to have been settled here since 345. It was formerly possessed by the Portuguese and later by the Dutch. Pop. 10,000.

CRANIAL NERVES, 12 important pairs of nerve branches which have their origin close to the brain stem and are connected with some of the most important functions of the body. The first or olfactory, the second or optic, the fifth or trigeminal, and the eighth or auditory, are largely sensory in their function, whereas the third or oculomotor, fourth or trochlear, sixth or abducens, seventh or facial, the ninth or glosso-pharyngeal, tenth or vagus, eleventh or spinal accessory and twelfth or hypoglossal are largely motor in their function. The sensory nerves originate in ganglia situated outside of the nervous axis, whereas the origin of the motor nerves is found in the medulla.

The first or olfactory nerve originates in the mucous membrane of the nose and sends its fibres backward into the brain, where perceptions of smell are located. The second or optic nerve originates in the ganglion cells of the retina and then passes by an extremely complicated series of tracks to the occipital area of the brain. Here sight memories are stored and destruction of this portion of the brain results in forms of sensory aphasia or of various types of partial blindness. The fifth nerve is a mixed nerve, containing both sensory and motor fibres. The sensory fibres originate largely from the Gasserian ganglion and the fibres are distributed over the surface of the face, neck and head, conveying sense impressions of touch. Branches also go to the teeth and toothache is usually an affection of these branches of the fifth nerve. The motor portion of the nerve originates in the medulla and is distributed to a number of the muscles of the jaw and throat. The eighth nerve originates in the organ of Corti in the ear and passes by a very complicated series of fibre tracks into the temporal lobe, where sense impressions of hearing are stored. The ninth, tenth and eleventh nerves are mixed, containing both motor and sensory fibres, the sensory fibres innervating the pharynx, tonsils, œsophagus, stomach, mucous membrane of the larynx, the motor fibres being distributed to the various muscles of the tongue, pharynx, larynx, heart and lungs. The tenth nerve is of particular interest in that it is the great nerve of the heart and lungs, being the chief inhibitory or regulatory nerve of the heart. Of the purely motor nerves the third or oculomotor is distributed to a number of muscles of the eye. The fourth innervates the muscles of the eye, as does also the sixth. The seventh innervates the muscles of the face, and in facial palsy this nerve is affected. The twelfth nerve is exclusively motor, originates in the medulla and is distributed to the muscles of the tongue and associated muscles at the base of the skull. The cranial nerves are continuous with the spinal nerves, but are more highly specialized. Consult «Cranial Nerves» in Buck, ‹Reference Handbook of the Medical Sciences,› Vol. III); also Jelliffe and White, ‹Diseases of the Nervous System› (2d ed., Philadelphia 1917).

CRANK, in mechanics, is a fundamental form of the lever. The word means primarily a bend, the simple form of crank being a bend of an axle for turning it. On a windlass the crank is the cross-piece that joins the axle with the handle. In a steam-engine the crank may take the form shown in the diagram at 1, in which the broad end of the crank is keyed fast to a rotating shaft and the smaller end is loosely bolted to a connecting rod, for producing reciprocating motion. Sometimes the crank takes the form of a wheel, when it is termed a wheel-crank, as at 2. Here the other end of the connecting rod shows connection with a piston. The double crank shown as 3 is employed where the crank interrupts the axle lengthwise. B and B are the cranks and A the connecting rod. A three-throw crank is constituted by three of these double cranks on one axle. When there are two or more cranks on one axle they are placed oppositely so as to balance. The one theoretical difficulty with a single crank is that it has two dead centres in every revolution, the dead centre being a point at which if stopped the parts are so in line that neither a push nor a pull on the connecting-rod will start rotation. With a three-throw crank the dead centres are so timed that one crank is always in working position. The crank is the simplest device known for altering reciprocating (or back and forth) motion into rotary motion, or vice-versa, as it has few parts and nothing to get out of order, while the reciprocating part slows up and starts again with the most desirable speed ratio, obviating all shocks in the machine. A crank-pin is the pin or bolt that joins the crank proper to the connecting rod. A bell-crank is a bent lever somewhat resembling an engine crank, for changing the direction of motion of a wire that pulls a mechanically operated bell.



Cranks

CRANMER, Thomas, English prelate and reformer: b. Aslacton, Nottinghamshire, 2 July 1489; d. Oxford, 21 March 1556. He was educated at Cambridge and in 1523 was chosen reader of theological lectures in his college and examiner of candidates for degrees in divinity. In the course of conversation on the meditated divorce of Henry VIII from Catharine of Aragon Cranmer remarked that the question of its propriety might be better decided by consulting learned divines and members of the universities than by an appeal to the Pope. The opinion thus delivered gained the favor of the king and Cranmer was sent for, made a king's chaplain and commanded to write a treatise on the subject of the divorce. In 1530 he was sent abroad with others to collect the opinions of the divines and canonists of France, Italy and Germany on the validity of the king's marriage. At Rome he presented his treatise to the Pope and afterward proceeded to Germany, where he obtained for his opinions the sanction of a great number of German divines and civilians, and formed intimate connections with the rising party of the Protestants which probably influenced his future conduct greatly. In January 1533 he was announced as the new archbishop of Canterbury, and on 30 March he was consecrated at Westminster. Soon after, he set the papal authority at defiance by declaring invalid the marriage between Henry and Catharine and confirming the king's marriage with Anne Boleyn. Next year an act of Parliament was passed for abolishing the Pope's supremacy and declaring the king chief head of the Church of England. The new or revised English translation of the Bible, now appointed to be placed in churches, received the name of 'Cranmer's Bible.'

On the death of Henry, in 1547, the archbishop was left one of the executors of his will, and member of the regency appointed to govern the kingdom during the minority of Edward VI. He proceeded to model the Church of England according to the notions of Zwinglius, rather than those of Luther. By his instrumentality the liturgy was drawn up and established by act of Parliament, and articles of religion were compiled, the validity of which was enforced by royal authority and for which infallibility was claimed. The exclusion of the Princess Mary from the crown, by the will of her brother, was a measure in which Cranmer joined the partisans of Lady Jane Grey, apparently in opposition to his own judgment. With others who had been most active in her elevation, he was sent to the Tower on the accession of Mary. He was tried for treason, and being condemned was sentenced to death, but was spared by the queen, though he lost his position as archbishop of Canterbury. In March 1554 he was sent to Oxford with Ridley and Latimer, and after being kept in prison for nearly a year and a half they were formally tried. Cranmer's trial took place before a papal commissioner, on the charges of blasphemy, perjury, incontinence and heresy, and he was sentenced to be degraded and deprived of office. After this, promises were made, which induced him to sign a recantation of his alleged errors. He was placed on a scaffold in Saint Mary's Church, the day he was to suffer, there to listen to a declaration of his faults and heresies. Instead of confessing the justness of his sentence and submitting to it in silence, or imploring mercy, he calmly acknowledged that the fear of death had made him belie his conscience; and declared that nothing could afford him consolation but the prospect of extenuating his guilt by encountering, as a Protestant penitent, with firmness and resignation, the fiery torments which awaited him. He was immediately hurried to the stake, where he kept his right hand, with which he had signed his recantation, extended in the flames, that it might be consumed before the rest of his body, exclaiming from time to time, «That unworthy hand.» His principal writings were edited by Jenkyns, 'Remains of Archbishop Cranmer' (Oxford 1833); and by Cox, for the Parker Society, under the titles, 'Writings and Disputations Relative to the Lord's Supper' (Cambridge 1844) and 'Miscellaneous Writings and Letters' (ib. 1846). Consult Strype, 'Memorials of Thomas Cranmer' (Oxford 1848–54); and his 'Ecclesiastical Memorials' (ib. 1882); Nichols, 'Narrative of the Reformation,' Camden Society, from the papers of John Foxe; and Brewer and Gairdner, 'Calendars of Letters and Papers, Foreign and Domestic, of the Reign of Henry VIII' (ib. 1862–80); Todd, 'Life' (1861); Hook, 'Thomas Cranmer' (in 'Lives of the Archbishops,' 1868); Lingard, 'History of England' (Vol. V); Froude, 'History of England' (Vols. I–VI); Green, 'History of the English People' (Vol. II, 1879); Mason, 'Thomas Cranmer' (1898); Pollard, 'T. Cranmer and the English Reformation, 1489–1856' (London 1904); Foxe, 'Acts and Monuments' (ib. 1877); Burnet, 'History of the Reformation' (New York 1842).

CRANNOG, a fortified lake dwelling. See LAKE DWELLINGS.

CRANSTON, Earl, American Methodist bishop: b. Athens, Ohio, 27 June 1840. He was graduated at Ohio University 1861; served in the cavalry during the Civil War, rising to the rank of captain, 1862–64. He entered the Methodist Episcopal ministry, 1867; was publishing agent of the Church 1884–96, when he was elected a bishop. During 1898–1900 he visited China, Japan and Korea in discharge of his episcopal duties. He was commissioner from his Church for uniting all Methodist missions in Japan into one Japanese Methodist Church in 1907; presided at the Methodist Episcopal Conferences in Germany, Sweden, Denmark, Norway, Finland and Italy in 1909; chairman of Commission on Finance and Commission on Federation of Methodist Churches for his denomination; became senior bishop of the Church in 1912.

CRANSTON, R. I., town in Providence County, on the New York, New Haven and Hartford Railroad. Cranston was originally a part of Providence, but was incorporated as a separate township in 1754. The villages that were included in the town were consolidated under a city charter in 1910. The chief industries are market gardening, brewing, dairying and the manufacture of cotton and print goods, tubing and wire. The government is administered by a mayor and city council. It receives its water supply from Providence. The town is the site of the State prison and of reform schools for boys and girls. Pop. 21,107.

CRANTARA, krăn'tă-ra (Gael. crann, a beam + tair, reproach, disgrace), a fiery cross which formed the rallying symbol in the Highlands of Scotland on any sudden emergency, so called because the neglect of the symbol implied infamy. The Highlanders appear to have borrowed it from the ancient Scandinavians, of whose use of it Olaus Magnus gives a particular account. As late as the insurrection in 1745 the crantara was circulated in Scotland, and on one occasion it passed through the district of Breadalbane, a tract of 32 miles, in three hours. After Charles Edward had marched into England, two of the king's frigates threatened the coast with a descent. The crantara was sent through the district of Appin by Alexander Stuart of Invernahyle (who related the circumstance to Sir Walter Scott), and in a few hours a sufficient force was collected to render the attempt of the English hopeless.

CRAPAUD, kră-pō', **Jean**, or **Johnny**, a nickname applied to Frenchmen, as that of John Bull is similarly applied to Englishmen. It has its origin from the popular belief that all Frenchmen were frog eaters, «crapaud» meaning a «frog or toad.»

CRAPE, a light, transparent stuff, like gauze, made of raw silk, gummed and twisted on the mill, woven without crossing and much used in mourning. Crapes are either craped (that is, crisped) or smooth. The silk destined for the first is more twisted than that for the second, it being the greater or less degree of twisting, especially of the warp, which produces the crisping given to it when taken out of the loom, steeped in clear water and rubbed with a piece of wax for the purpose. Crapes are all dyed raw. This stuff came originally from Bologna, where tradition says it was made in the 7th century; but till of late years Lyons has had the chief manufacture of it. It is now manufactured in various parts of Great Britain. The crape brought from China is of a more substantial fabric. A woolen imitation is craped by machine rollers.

CRAPPIE, krăp'ĭ, a widely distributed American sunfish (*Pomoxys annularis*) with a confusing number of local names, such as «bachelor,» «Campbellite,» «new-light,» «tin-mouth» or «paper-mouth,» etc., in the central Mississippi Valley, and «sac-à-lait» and «chinquapin» in the Gulf States, where it is especially numerous. It is silvery olive in color, mottled with dark green on the upper part of the body, with vertical bars on the high fins. It may readily be distinguished from its congener, the calico bass, by the fact that its dorsal fin has not more than six spines. It will take a minnow-bait with the avidity of a black bass, but will not make so keen a fight. Its range has lately been very widely extended by the efforts of the United States Fish Commission. Consult Jordan and Evermann, ‹Food and Game Fishes of America› (1902). See SUNFISH.

CRASHAW, Richard, English poet: b. London about 1613; d. 25 Aug. 1649. He was educated at the Charterhouse and at Cambridge. In 1637 he became a Fellow of Peterhouse, and having been admitted to orders, was noted as an eloquent and powerful preacher. In 1634 a volume of Latin poems, under the title of ‹Epigrammata Sacra,› had been published anonymously by him at Cambridge. In 1644 he was ejected from his fellowship by the Parliamentarians for refusing to take the Covenant, and proceeded to Paris, where he became a convert to the Roman Catholic faith. Through the influence of Cowley, he was introduced to Queen Henrietta Maria, who recommended him to Cardinal Palotto at Rome. The cardinal afterward made him a canon in the church of Loretto. In 1634 he published a volume of Latin poems. A collection of poems by him, entitled ‹Steps to the Temple, Sacred Poems, with other Delights of the Muses,› was published in 1646; and a posthumous volume 1652, ‹Carmen Deo Nostro.› Gilfillan published some of Crawshaw's poems in his edition of ‹British Poets›; and an edition by Grosart was published in 1872 (with supplement in 1888); and Waller, A. R., ‹Poems› (in the ‹Cambridge English Classics,› 1908). Consult Coleridge, ‹Literary Recollections› (1836); Gosse, ‹Seventeenth-Century Studies.›

CRASSULACEÆ, krăs-ū-lā'sē-ē, a family of plants of the order *Rosales*. It contains 15 genera and upward of 500 species, widely distributed throughout the world. The petals are persistent, the calyx is free and the fruit consists of distinct carpels. The *Crassulaceæ* are herbs or shrubs, mostly fleshy or succulent. The best-known species of the family are the orpine or live-forever (*Sedum telephium*) and various stonecrops. The family is particularly rich in tropical species, which are known for the beauty of their flowers, and are cultivated in hothouses and used for bedding out in warm, dry locations.

CRASSUS, Lucius Licinius, Roman orator: b. 140 B.C.; d. 91 B.C. He is introduced by Cicero, in his treatise ‹De Oratore,› as the representative of that writer's own opinions on the subject of oratory. In 95 B.C. he was elected consul, with Quintus Mucius Scævala (who had been his colleague in all his previous offices). He was unfortunate as a legislator, inasmuch as the law proposed by him, to compel all who were not citizens to depart from Rome, was a main cause of the Social War. He became censor in 92 B.C., when he closed all the schools of the rhetors, on the ground that their influence on the minds of the young was bad. He was distinguished for his love of the arts; and his mansion upon the Palatium is cited, both for its architecture and for the statuary and paintings with which it was adorned, as having been one of the most noteworthy buildings in ancient Rome. Consult the Introduction to Wilkin's edition of Cicero's ‹De Oratore› (2d ed., Oxford 1888).

CRASSUS, Marcus Licinius, Roman triumvir, surnamed DIVES: b. about 115 B.C.; d. 53 B.C. When Sulla landed in Italy, 83 B.C., Crassus joined him and rendered him important services, for which he was rewarded with donations of confiscated property, besides being allowed to purchase confiscated estates at an almost nominal value. He was exceedingly fond of wealth, and also skilful and by no means scrupulous in the ways and means of accumulating it. In 71 B.C. he was created prætor, and took the command against Spartacus and the revolted slaves. Spartacus was defeated and slain, along with a great number of his followers, and 6,000 captured slaves were crucified along the road between Rome and Capua. In 70 B.C. Crassus was elected consul, having Pompey as his colleague; was censor in 65 and with Cæsar and Pompey made up the first triumvirate in 55. In this year he obtained the province of Syria, and professed to make preparations of war against the Parthians, which he used as a ruse to gain more money. In 54 B.C. he undertook a campaign, after which he returned to Syria. In the following year he set out again and was defeated at the river Bilechas by the Parthians. Retreating to the town of Carrhæ, he was slain at a conference with the Parthian general.

CRATÆGUS, genus of plants placed by American botanists in the apple family (*Pomaceæ*). The genus includes about 50 species, natives of the north temperate zone, Mexico and the Andes of parts of Central America. The name is from the Greek, meaning «strong,» and the plants are so called from the toughness of their wood. Twenty or more of the genus are found in North America. They are all large shrubs or small trees, more or less thorny; hence the name thorn, which is generally applied to them. The best-known American species is *C. crus-galli* or cockspur thorn, a shrub or small tree with a maximum height of 30 feet, the thorns numerous and slender, which blossoms in May and June in thickets from western Quebec westward to Manitoba and southward to Florida and Texas. The wood is heavy, weighing about 45 pounds to the cubic foot. The hawthorn, hedge-thorn, May-bush or quickset is *C. oxyacantha*. The scarlet thorn, haw or red haw is *C. coccinea*. It is a small tree, reaching 30 feet high, growing in the same region as *C. crus-galli*. The wood is hard, of a reddish brown color and weighs about 53 pounds per cubic foot. The azaroles (*C. azarolus*), natives of the Levant, are occasionally cultivated for their fruit, which is about the size of the Siberian crab, and is used either for dessert or for pies. *C. orientalis* (or *odoratissima*) and *C. tanacetifolia* have also fruit of considerable size. The latter is much eaten in Armenia. *C. mexicana* has a large fruit, like a small apple, but not eatable. It is, however, very ornamental. The wood of most of the species much resembles that of the hawthorn. It is common to graft the rarer species on the hawthorn.

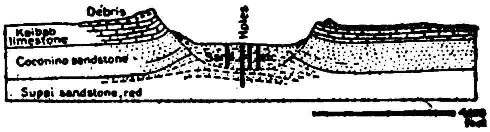
CRATER (Gr. κρατηρ, bowl), the opening on the tops or sides of volcanic mountains, through which the lava and ashes are ejected. The crater of Ætna, like many of the most ancient volcanoes, does not retain the bowl-like shape to which the name owes its origin; that of Vesuvius, however, preserves the typical form. Variations in the form of the crater are due to varying violence of the eruption. The more powerful eruptions tear off the mountain top and produce the hollowed cup. The craters of the Hawaiian volcanoes are usually large, that of Kilauea being about 2½ miles in diameter and filled with a lake of molten rock. Such large craters are known as calderas.

CRATER, one of Ptolemy's constellations, near the autumnal equinox. It is sometimes considered a part of the constellation Hydra, and contains 35 stars visible to the naked eye, the two largest being of the fourth magnitude.

CRATER LAKE, in general, a term applied to any lake occupying the crater of an extinct or dormant volcano. In the United States the name is given to a small lake in the Cascade Mountains, in Oregon, remarkable for its wall of nearly perpendicular rock, from 1,000 to 2,000 feet high. The lake is about six miles in diameter and the water is nearly 2,000 feet in depth. A small cone within the main crater forms Wizard Island. The region about Crater Lake has been set aside as a national park.

CRATER LAKE NATIONAL PARK, a government reservation created by act of Congress approved 22 May 1902. It is situated in southwestern Oregon, about 60 miles from the California boundary, on the crest of the Cascade Mountains. Measuring approximately 18 miles north and south by 13½ miles east and west, it has an area of 159,360 acres and includes the wreck of Mount Mazama, whose sides now form the bowl containing the lake that gives the park its name. The accepted explanation of such geological and topographical conditions as are observed at present is that plutonic forces destroyed the mountain's crest, leaving a vast crater which gradually filled with clear spring water to its present depth of 2,001 feet, on all sides of which the walls of the crater still rise to heights ranging from 500 to nearly 2,000 feet. The surface of the lake, 6,177 feet above sea-level, has an area of 20¼ square miles. A movement was started by W. G. Steel 16 Aug. 1885 for the creation of a national park at this point. Until then the lake was but little known, even among the residents of southern Oregon, although its discovery occurred 12 June 1853; and Mr. Steel's plan "was successful," he writes, "only after 17 years of strenuous labor." The lake was first stocked with fish (rainbow trout) in 1888. A survey for a road entirely around the lake and close to the rim wherever possible was made under the direction of the Secretary of War, and a report submitted to Congress estimated the total cost at approximately $700,000. Of that amount an appropriation was made of $125,000 for use during the season of 1913, $85,000 for 1914 and $50,000 for 1915. Under these appropriations grading proceeded steadily; besides a portion of the rim road, roads from the Klamath, Medford and Pinnacles entrances were constructed; and the official report for 1915 contained the statement that a line of automobile stages, maintained by the Crater Lake Company from Medford, on the main line of the Southern Pacific Railway, and from Chiloquin, on the northerly extension of the Southern Pacific from Klamath Falls, or the Crater Lake cut-off, was rendering satisfactory service in transportation of visitors (11,371 at the close of September 1915, as against 7,096 at the same time in 1914). During the season of 1915 Crater Lake Lodge, located on the rim of the lake, nearly 1,000 feet above the water, was opened to the public; and to this building additions were made in 1916. By that time the lake had become abundantly supplied with large rainbow trout, the largest taken weighing six or seven pounds. The park, according to the superintendent's enumeration, abounds in black and brown bear, black-tailed deer, cougar, lynx, timber-wolves, coyotes, pine marten, squirrels of several varieties, ringtail grouse, the common pheasant, Clark crow, etc. During 1915 private telephone lines were purchased and lines required for the improvement of that service were constructed; progress was also made in connection with the proposed tourist village. It is evident that Klamath and Modoc Indians, who fancied that the lake held the throne of the god Llao, were not insensible to the mystery and wonder of the scene, which received its most striking characterizations — as "The sea of Silence" and "A sea of sapphire set around by a compact circle of the great grizzly rock of Yosemite" — at the hands of Joaquin Miller. The government's purpose in the creation of such parks is stated in the article NATIONAL PARKS AND MONUMENTS.

CRATER MOUND, Arizona. This feature in the plains 25 miles due west of Winslow, Ariz., formerly known as Coon Butte, is one of the most remarkable natural wonders in existence. It consists of a crater 600 feet deep and 400 feet in diameter surrounded by a rim 100 to 150 feet high. This rim consists of loose fragments of rock and sand from the hole. The walls of the hole are limestone (Kaibab) and sandstone (Coconino), more or less upbent and shattered. The relations are shown in the figure. The cause of this extraordinary hole is one of the perplexing questions over which scientists speculate. It has been suggested that



Section through Crater Mound, Arizona Plateau the crater was caused by impact of a large meteor, a view sustained by the occurrence of many small masses of meteoric iron in the vicinity, but a mining company organized to find and work the large mass of iron presumably buried in the hole obtained no evidence of its existence. A detailed survey with magnetic needle hung to swing vertically also failed to indicate the presence of a body of metallic iron. A plausible suggestion is that the hole was caused by explosion of volcanic steam accumulating in the porous sandstone under the dense limestone and finally reaching the limit of tension. Many conspicuous volcanic features occur in the general neighborhool but not in the immediate vicinity of the hole. Closely similar craters due to explosion are known in the Southwest, in Mexico and other parts of the world.

N. H. DARTON,
United States Geological Survey.

CRATERUS, Macedonian general: d. 321 B.C. After the death of Alexander the Great he received, together with Antipater, the government of Macedonia and Greece. He assisted Antipater in the Lamian War, and also against the Ætolians and Perdiccas, and fell in a battle against Eumenes.

CRATES, krā'tēz, **OF ATHENS,** Greek comic poet: flourished about 450 B.C., and contemporary with Cratinus. Eminent as an actor, he often performed the principal parts in the plays of Cratinus. As a comic poet he was the first Athenian who ventured to follow the example of Epicharmus so far as to bring drunken characters on the stage. Aristotle in his ‹Poetics› bears testimony to the excellence of his works. Little, however, is really known of them. Meineke, who has made a careful analysis of the statements of ancient writers on the subject, gives the titles of 14 ascribed to him. Fragments of eight of these are still extant. Consult Kock, ‹Comicorum Atticorum Fragmenta› (Leipzig 1880).

CRATES OF MALLOS, Greek grammarian: flourished about 150 B.C. He founded the celebrated Pergamene school of grammar, and became the great rival of Aristarchus, of the Alexandrian school. From his work on Homer he is said to have been called *Ομερικος*. He wrote commentaries on Hesiod, Euripides and Aristophanes. Only a few fragments of his works are preserved. Under him the catalogue of the Pergamene Library was enlarged and catalogued. Later grammarians based their works on his study of the Attic dialect. About 167 B.C. he was sent as an ambassador to Rome, where he introduced the study of formal grammar. Consult Suetonius, ‹De Grammaticus› (Vol. 2); Wachsmuth, ‹De Cratete Mallota› (Leipzig 1860); Susemihl, ‹Geschichte der griechischen Litteratur in der Alexandrinerzeit› (Vol. II, ib. 1892); Sandys, ‹A History of Classical Scholarship› (Vol. I, 2d ed., Cambridge 1906).

CRATES OF THEBES, Greek cynic philosopher: flourished about 320 B.C. He was born at Thebes and inherited a large property. This he renounced early and removed to Athens, where he became the pupil of Diogenes, and afterward one of the most eminent in that school of philosophers. According to Diogenes Laertius, he lived a cynic of the straitest sort. He was the teacher of Zeno, the founder of stoicism, and thus formed the connecting link between cynicism and stoicism.

CRATINUS, krạ-tī'nŭs, Greek comic poet: b. about 520 B.C.; d. 422 B.C. The ‹Archilochoi,› supposed to have been his earliest production, was not exhibited till he was upward of 70 years of age; but he lived to achieve much for his profession, and at the advanced age of 97 died at the height of his fame, having just triumphed over Aristophanes himself. He found the Greek comedy a mere plaything, employed to excite merriment and laughter, and at once converted it into a terrible weapon for the chastisement of public and private vice. Horace particularly commends the public spirit and the impartial justice with which he exercised his censorship over the morals of his age. The uniform testimony of ancient writers places Cratinus in the first rank as a comic poet. His great rival, Aristophanes, was fully aware of his power. In the ‹Knights› he compares him to a torrent carrying everything before it. According to the best authorities he wrote but 21 dramas, 9 of which were successful in the Dionysiac contest. Not a single one of his dramas is now extant; only a few fragments remain to attest the excellence of his admired productions. The 400 fragments of his works then known were collected by Kock, ‹Comicorum Atticorum Fragmenta› (Vol. I, Leipzig 1880). In the ‹Axyrhynchus Papyri› (Vol. IV, 1904) appeared the newly found argument of a play ‹Dionysalexander,› of which nine fragments had been known, though they did not reveal the plot. Consult Körte, ‹Hermes› (1904); and Morgan, ‹Addresses and Essays› (25–33, New York 1910).

CRATINUS, Greek poet of the middle comedy, contemporary with Plato, the philosopher, and sometimes confounded with his elder and more celebrated namesake preceding. He flourished in the middle of the 4th century B.C. Eight plays are ascribed to him. Consult Meineke, ‹Fragmenta Com. Graecorum› (Vol. I. pp. 411–414; Vol. III, pp. 374–379).

CRATIPPUS, krạ-tĭp'us, Greek historian, contemporary with Thucydides. He continued the work of the great historian, and brought it down, according to Plutarch, to the time of Conon. The well-known words of Dionysius: “He wrote what Thucydides left unwritten,” evidently show that Cratippus not only continued the history of Thucydides, but also supplied whatever omissions he thought he found in it. He has gained in importance in recent times because of an historical fragment discovered by Grenfell and Hunt and published by them in ‹Oxyrhynchus Papyri› (V, 1907–08). The fragment has come to be known as the Hellenica Oxyrhynchia. Consult Hunt, in ‹The Year's Work in Classical Studies› (London 1908). The present tendency is to ascribe the work rather to some one other than Cratippus. Consult also Walker, ‹The Hellenica Oxyrhynchia: Its Authorship and Authority› (Oxford 1913).

CRATIPPUS, Greek peripatetic philosopher: b. Mitylene about 75 B.C. He appears to have been held in the highest estimation by the great men of his age. Cicero calls him the prince of all the philosophers whom he had known. Pompey visited him after his defeat at Pharsalia, and received at his hands the consolations of philosophy; and Brutus went to Athens, to which city Cratippus had latterly betaken himself, to listen to his prelections, even while making preparations to meet Octavius and Antony. Nothing that he wrote has survived.

CRAVEN, Alfred Wingate, American civil engineer: b. Washington, D. C., 20 Oct. 1810; d. Chiswick, England, 29 March 1879. He was graduated at Columbia College in 1829, and was largely employed in railroad construction and management. His most important work was in New York, in connection with its sewerage, it supply of Croton water and the improvement of Fourth avenue. From the organization of the Croton water board, in 1849, till 1868 he was its engineer, and planned and supervised the construction of the great works of that period. Among these were the Central Park Reservoir completed in 1867, the reservoir at Boyd's Corners and the survey of the Croton Valley. The establishment of the sewerage system of New York is largely due to his endeavors. He was a founder, director many years and president, 1869–71, of the American Society of Civil Engineers.

CRAVEN, Elijah Richardson, American Presbyterian clergyman: b. Washington, D. C., 28 March 1824; d. 1908. He was graduated at Princeton 1842, and from its Theological Seminary 1848. Ordained in the Presbyterian ministry 1850, he held pastorates at Somerville and Newark, N. J., 1850–87, when he became secretary of the Presbyterian Board of Publication and Sabbath-school Work, remaining in this relation till 1904. He was the American editor of Lange's ‹Commentary on the Book of Revelation.›

CRAVEN, Pauline de la Ferronays (Madame Augustus), French religious novelist: b. Paris 1820; d. there, 1 April 1891. Her father was at one time French Ambassador to Berlin. In 1834 she married an Englishman named Craven, a descendant of the Margravine of Anspach. She traveled extensively and lived much in England. Her principal literary works include articles on English politics and biographical sketches of Sister Nathalie Narishkin and of Lady Georgiana Fullerton, and ‹Reminiscences› of England and Italy. She is best known for her ‹Family Memoirs› and ‹The Story of a Sister,› a picture of a noble Roman Catholic family and the slow passing away of a simple-minded and deeply religious woman; and other fictions are as well known in English translations as in their original French. The best of her novels are ‹Anne Severin,› ‹The Enigma's Answer› and ‹Fleurange,› in all of which she is an ardent advocate of Roman Catholicism. Consult Bishop, Mary, ‹Memoir of Mrs. Craven› (London 1894); Smith, J. F. A., ‹The Life of Mrs. Augustus Craven› (Nürnberg 1910).

CRAVEN, Thomas Tingey, American naval officer: b. Washington, D. C., 30 Dec. 1808; d. Boston, Mass., 23 Aug. 1887. He joined the navy in 1822; was promoted captain in June 1861, and the same year was given command of the *Brooklyn,* with which vessel he took part in the capture of New Orleans and the later actions on the Mississippi. In 1862 he was placed in command of the *Niagara,* and during the remainder of the war he served along the coasts of England and France. He was promoted rear-admiral in October 1866; retired in December 1869.

CRAVEN, Tunis Augustus Macdonough, American naval officer: b. Portsmouth, N. H., 11 Jan. 1813; d. 5 Aug. 1864. He entered the navy in 1829; in 1857 surveyed the Isthmus of Darien; coasted about Cuba to intercept slave ships, and in the Civil War had part in preventing the capture of the fort on Key West. Given the rank of commander, he joined Farragut's fleet off Mobile, commanding the monitor *Tecumseh.* In the battle of Mobile Bay the *Tecumseh* was sunk by running upon a torpedo, and Craven and almost all his crew lost their lives.

CRAWFISH. See Crayfish.

CRAWFORD, Coe Isaac, American statesman: b. Volney, Iowa, 14 Jan. 1858. He was graduated in 1882 from the law department of the University of Iowa, practised law for one year in that State and for 15 years in Pierre, S. D.; was a member of the Dakota territorial legislature in 1889, and upon the admission of South Dakota into the Union in that year became a member of the first State senate. He was attorney-general in 1892–96; and, after removal to Huron, S. D., in 1897, was attorney for the Chicago and Northwestern Railway Company until 1903. In 1907 he was elected governor of South Dakota on the Republican ticket and in the following year United States Senator for the term expiring 3 March 1915.

CRAWFORD, Francis Marion, American novelist: b. Bagni di Lucca, Italy, 2 Aug. 1854; d. Sorrento, Italy, 8 April 1909. He was educated at Trinity College, Cambridge, and afterward studied Sanskrit and other subjects on the European continent. In 1879–80 he was editor of the Allahabad *Indian Herald* and for nearly 20 years subsequently resided mainly in Italy. His novels and other writings include ‹Mr. Isaacs› (1882); ‹Doctor Claudius› (1883); ‹A Roman Singer› (1884); ‹An American Politician› (1884); ‹Zoroaster› (1885); ‹A Tale of a Lonely Parish› (1886); ‹Marzio's Crucifix› (1887); ‹Saracinesca› (1887); ‹Paul Patoff› (1887); ‹With the Immortals› (1888); ‹Greifenstein› (1889); ‹Sant' Ilario› (1889); ‹A Cigarette-maker's Romance› (1890); ‹The Witch of Prague› (1891); ‹Khaled› (1891); ‹The Three Fates› (1892); ‹The Children of the King› (1892); ‹Don Orsino› (1892); ‹Marion Darche› (1893); ‹Pietro Ghisleri› (1893); ‹The Novel: What Is It?› (1893); ‹Katharine Lauderdale› (1894); ‹Love in Idleness› (1894); ‹The Ralstons› (1895); ‹Constantinople› (1895); ‹Casa Braccio› (1895); ‹Taquisara› (1896); ‹A Rose of Yesterday› (1897); ‹Corleone› (1897); ‹Ave, Roma Immortalis› (1898); ‹In the Palace of the King› (1898); ‹Via Crucis› (1899); ‹The Rulers of the South› (1900); ‹Marietta› (1900); ‹Cecilia› (1902); ‹Man Overboard› (1903); ‹Gleanings from Venetian History› (1905); ‹Whosoever Shall Offend› (1904); ‹Fair Margaret› (1905); ‹Prima Donna› (1908); ‹The White Sister› (1909). As a novelist Crawford is characterized by excellence in the depicting of character and general carefulness in the handling and collection of his materials. The Saracinesca series, stories of modern Rome, is generally regarded as his most important performance. He had the beguiling gift of the born story-teller who has also become an accomplished master in the art of fiction. Ingenious plots, a varied company of interesting dramatis personæ faithfully studied and freshly portrayed, picturesque settings and behind all the attractive personality of an intelligent and cultivated man of the world — these characteristics explain and justify the delight with which an immense audience, American and European, welcomed the annual appearance of one of the long series of his novels. In his historical works he betrays a gift of conjuring up the life of the Italian past in a manner that makes the spirit and the facts of history as entertaining as a romance. Several of his novels have been translated into German, and he himself produced French versions of 'Zoroaster' and 'Marzio's Crucifix.' In recognition of his merits as a writer the French Academy bestowed on him the Monbrun prize and a gold medal.

CRAWFORD, George Washington, American lawyer: b. Columbia County, Ga., 22 Dec. 1798; d. 22 July 1872. He was graduated at Princeton 1820; was attorney-general of Georgia 1827–31; a member of the State legislature 1837–42, and Whig representative in Congress 1843. He was elected governor of Georgia 1843, and re-elected 1845. He was Secretary of War in President Taylor's Cabinet 1849–50, resigning upon the death of the President.

CRAWFORD, John Martin, American physician and surgeon: b. Herrick, Pa., 18 Oct. 1845. He was graduated from Lafayette College 1871; from Pulte Medical College, Cincinnati, 1878; from Miami Medical College 1881; he was professor of physiology, microscopy and of physical diagnosis in the Pulte Medical College 1881–89. He was consul-general of the United States to Russia 1889–95; commissioner of the World's Fair 1892–93. He made the first complete English translation of 'The Kalevala,' the national epic of Finland (1888). He also edited and translated from manuscript a five-volume edition of 'The Industries of Russia.' He introduced into Russia the American system of governmental crop reports. He is president of the Ohio chapter of Phi Beta Kappa; president of the American National Bank, Cincinnati; president of the Cincinnati Discount Company, and director in several industrial and manufacturing corporations; lecturer on the Finns and their ancient literature, and on Russia and on Russian folk-lore. He received the unusual honor of election to honorary membership in the Finnish Literary Society at Helsingfors, Finland. He is an active member of the Literary Society of Cincinnati, established in 1848. In 1899 he received the degree of LL.D. from Ohio University.

CRAWFORD, John Wallace («CAPTAIN JACK»,) American author: b. County Donegal, Ireland, 4 March 1847; d. Woodhaven, N. Y., 28 Feb. 1917. He served in the 48th Pennsylvania Volunteers in the Civil War, and while lying wounded in a hospital at West Philadelphia was taught to read and write by a Sister of Charity. As a scout he served under General Crook in the Sitting Bull campaign in 1876 and later against the Apaches in New Mexico. In 1886 he retired from the army, was a miner and ranchman in New Mexico for many years, went to the Klondike in 1898, remaining there two winters, and finally became a public lecturer. Besides many poems, several songs and more than 100 short stories, «Captain Jack» is author of 'The Poet Scout — a Book of Song and Story' (1885); 'Campfire Sparks' (1888); 'Tat,' a drama (1900); 'Colonel Bob,' a drama, with Marie Madison (1909); 'Whar' the Hand o' God is Seen and Other Poems' (1911).

CRAWFORD, Mary Caroline, American author: b. Boston, Mass., 5 May 1874. She was educated at Radcliffe College, and besides contributing editorially and otherwise to various New York and Boston journals, was literary editor of the Boston *Budget* 1898–1902. In 1907–08 she was secretary of the Women's Trade Union League; she then became secretary of the Ford Hall meetings. She has published 'The Romance of Old New England Roof Trees' (1902); 'The Romance of Old New England Churches' (1903); 'The College Girl of America' (1905); 'Among Old New England Inns' (1907); 'St. Botolph's Town' (1908); 'Old Boston Days and Ways' (1909); 'Romantic Days in Old Boston' (1910); 'Goethe and his Women Friends' (1911; 2d ed., 1913); 'Romantic Days in the Early Republic' (1912); 'The Romance of the American Theatre' (1913); 'Social Life in Old New England' (1914).

CRAWFORD, Samuel Wylie, Federal general: b. Franklin County, Pa., 8 Nov. 1829; d. Philadelphia, Pa., 3 Nov. 1892. He graduated at the University of Pennsylvania in 1846; was licensed to practice medicine in 1850; served as assistant surgeon in the United States army in Texas, New Mexico and Kansas, 1851–60; commanded a battery at the bombardment of Fort Sumter in April 1861; became major of the 13th Infantry in August 1861, and on 25 April 1862 was appointed brigadier-general of volunteers, commanding a brigade in the army of the Potomac. He served throughout the Shenandoah Valley campaign (q.v.), distinguished himself at Winchester, Cedar Mountain, South Mountain and Antietam, and, on the wounding of General Mansfield, was placed in charge of a division. He commanded the Pennsylvania reserves at Gettysburg, being brevetted colonel for gallant conduct; was engaged in all the battles of the army of the Potomac and was present at Lee's surrender. He was brevetted major-general of volunteers 1 Aug. 1864 for conspicuous gallantry in various battles; was brevetted brigadier-general of the regular army for conduct at Five Forks, and major-general for meritorious services throughout the war; and on 15 June 1866 was mustered out of the volunteer service. He became colonel of the 16th Infantry, 22 Feb. 1869, but in March was transferred to the 2d Infantry, of which he remained in command until 19 Feb. 1873, when he retired because of disability resulting from old wounds.

CRAWFORD, Thomas, American sculptor: b. New York, 22 March 1814; d. London, England, 16 Oct. 1857. He went to Rome, where he studied under Thorvaldsen. He passed much of his life in Rome. His most famous works comprise 'Orpheus and Cerberus'; 'Adam and Eve'; 'Hebe and Ganymede';

'Mercury and Psyche'; and 'Dancing Jenny.' His statue of the 'Genius of America' is placed on the dome of the capitol at Washington, and for the State of Virginia he made the equestrian statue of Washington, at Richmond. Other works are the bust of Beethoven, now in Symphony Hall, Boston; 'The Indian' (New York Historical Society); 'Flora' (Metropolitan Museum, New York). Crawford executed many bas-reliefs, and 87 of his plaster casts were presented by his wife to the commissioners of Central Park, who arranged them in a building for public exhibition. They have since been destroyed by fire. Consult Taft, Lorado, 'History of American Sculpture' (New York 1903), and Tuckerman, 'Book of the Artist' (ib. 1867).

CRAWFORD, William, American soldier: b. Berkeley County, Va., 1732; d. Wyandot County, Ohio, 11 June 1782. He was a surveyor by profession, and an associate of Washington, who trusted him greatly. He served with the Virginia riflemen through Braddock's campaign; was promoted captain on Washington's recommendation in 1761, and served through the Pontiac War 1763–64. When the Revolution broke out he joined Washington with a company of Virginians; was at the battles of Long Island, Trenton and Princeton; on frontier duty 1778, and was colonel when he resigned in 1781. In May 1782, at Washington's request, he commanded an expedition against the Wyandot and Delaware Indians on the Sandusky River. They met the Indians 4 June, and in the engagement which followed Crawford was captured and subsequently tortured by his captors before being burned at the stake. Consult Roosevelt, 'Winning of the West' (Vol. II, 1889); Butterfield, 'Expedition Against Sandusky' (1873); Hill, N. N., 'Crawford's Campaign' (in *Magazine of Western History*, Chicago 1885.)

CRAWFORD, William Harris, American statesman: b. Amherst County, Va., 24 Feb. 1772; d. Albert County, Ga., 15 Sept. 1834. In 1783 he settled in Georgia, was admitted to the bar in 1798 and entered on practice in Lexington. He was elected to the State senate in 1802 and to the United States Senate to fill a vacancy in 1807 (fighting two duels during the canvass); was re-elected for a full term in 1811; was chosen president of the Senate pro tem, in 1812. Refusing the Secretaryship of War, he was appointed Minister to France in 1813. Two years later he became Secretary of War, and the next year Secretary of the Treasury and held the latter office till March 1825. He was urged as a candidate for the Presidency several times, received the nomination in 1824, and in the election had 41 electoral votes. No choice for President having been reached, the election was decided in the House of Representatives, but meanwhile Crawford had been stricken with paralysis, which precluded his effectual candidacy. He never recovered wholly, although he still remained active politically, serving as judge of the northern circuit of Georgia from 1827 until his death.

CRAWFORD, William Henry, American educator: b. Wilton Centre, Ill., 6 Oct. 1855. He was graduated at Northwestern University 1884, and from Garrett Biblical Institute. After five years' pastoral work in the Methodist ministry he became professor of the history of theology in Gammon Theological Seminary 1889–93. In 1893 he was elected president of Allegheny College, Meadville, Pa. He was one of the judges to select the names for the Hall of Fame in New York. His publications include 'Life of Savonarola' (1906); 'The Church and the Slums' (1908); and 'Thoburn and India' (1909).

CRAWFORD NOTCH, the picturesque pass in the White Mountains, New Hampshire, between Mounts Webster and Wiley, at an elevation of about 2,000 feet above the Saco River, which flows through the notch.

CRAWFORDSVILLE, Ind., city and county-seat of Montgomery County, on Sugar Creek and the Chicago, Cleveland, Cincinnati and Saint Louis and the Vandalia and Monon Route railroads, 44 miles west of Indianapolis. It is the trade centre of an extensive agricultural region, with annual dealings of $3,500,000. It is the seat of Wabash College and contains a fine courthouse, a community house for women, a country club and a Carnegie library. The city is the home of five insurance companies, has manufactures of matches, paving bricks, burial furnishings, flour, foundry products, lumber, metal polish, barbed wire, etc. Settled in 1822, Crawfordsville was incorporated in 1865 and is governed under a charter of that date, which provides for a mayor, elected every four years, and a city council. The electric-light plant is owned by the city. Crawfordsville was the home of Gen. Lew Wallace, author of 'Ben Hur,' to whom a monument has been erected. Pop. 10,000.

CRAWFURD, Oswald John Frederick, English author: b. London, 18 March 1834; d. Montreux, 31 Jan. 1909. He was educated at Eton and Oxford and after serving as a clerk in the Foreign Office was English consul at Oporto, Portugal, 1867–91. Poet, novelist, essayist and anthologist, among his works are 'Travels in Portugal, by John Latouche'; 'Round the Calendar in Portugal'; 'Portugal: Old and New'; 'British Comic Dramatists'; 'Lyrical Verse from Elizabeth to Victoria'; 'Four Poets' (1899); 'Two Masques,' a book of verse; and the novels, 'The World We Live In'; 'Beyond the Seas'; 'Sylvia Arden'; 'The New Order.'

CRAWLEY, Edmund Albern, Baptist educationist: b. 1799; d. 1880. He was graduated at King's College, Windsor, Nova Scotia, and was called to the bar. Later he entered the Baptist ministry; in 1837 was a candidate for a chair in Dalhousie College, Halifax, but his claims were rejected by the dominant Presbyterian element on the board of that institution; and thereafter he became one of the founders and first principal of Queen's (afterward Acadia) College, Wolfville, established by the Baptist community of Nova Scotia.

CRAWSHAW, krâ'shâ, **William Henry,** American educator: b. Newburg, N. Y., 6 Nov. 1861. He was graduated at Colgate University, Hamilton, N. Y., 1887, and was elected professor of English literature there the same year. Since 1897 he has also been dean of the college faculty. He received the degree of A.M. from Colgate University, 1889; Litt.D., University of Rochester, 1909; and that of LL.D. from Syracuse University, 1910; studied at Oxford University, England, 1900–01; traveled in England, Scotland, Holland, Belgium, France, Germany, Switzerland, Italy, Spain, North Africa; member National Institute of Social Science; acting president of Colgate University, 1897–99, 1907, 1908; president pro tempore, 1908–09. He has published 'The Interpretation of Literature' (1896); 'The Literary Interpretation of Life' (1900); and an edition of Dryden's 'Palamon and Arcite' (1898); 'The Making of English Literature' (1907).

CRAYER, krī'yėr, Gaspar, Flemish painter: b. Antwerp 1582; d. 1669. He was a pupil of Raphael Coxcie, and became, by the study of nature, one of the greatest historical and portrait painters. At the Spanish court in Brussels he painted the portrait of the Cardinal Ferdinand, brother of the king, and received a pension. He established himself in Ghent, where he constantly executed works for the court, laboring with industry and perseverance till his 86th year. The city of Ghent alone had 21 altarpieces by him. In Flanders and Brabant are many of his works and some of his pictures are in the public collections at Vienna and Munich. His paintings are praised for fidelity to nature, excellent drawings and a coloring approaching the manner of Vandyke. He maintained a certain excellence in composition and execution, in spite of his great productivity. He was strongly influenced by his friend Rubens. Among the best known are 'The Four Crowned Martyrs' (Lille Museum); six pictures representing the entrance of the Cardinal infant (Ghent); 'Alexander and Diogenes' (Metropolitan Museum, New York); 'The Miraculous Draught of Fishes,' 'Adoration of the Shepherds' (Brussels Museum); 'Decapitation of St. John the Baptist' (Ghent Cathedral); 'Martyrdom of St. Blasius' (1668, Ghent Museum). His most important pupil was Jan van Cleve. Consult Maeterlinck, in 'Bulletin de la Société d'Histoire et d'Archéologie de Gand' (Ghent 1900).

CRAYFISH, or CRAWFISH (Fr. *écrevisse,* so not connected with "fish"), a fresh-water crustacean of the family *Astacidæ,* order *Decapoda.* They are known by their large size, lobster-like shape, the abdomen being as long as the cephalothorax, and ending in a broad tail-fin. The first pair of legs end in large claws (chelæ), not so large in proportion as those of the lobster, and those of each leg are nearly equal in size. Crayfish attain a length of three to six inches and live in streams or ditches, sometimes abounding in great numbers. They dig holes in the banks, from a few inches to a yard in depth, probably, like the lobster, using their big claws for this purpose. They lie at the mouth of their burrow with their claws extended ready to seize any passing insects, snails, tadpoles or frogs, and sometimes larger animals, and, like the lobster, they will not refuse carrion and occasionally feed on succulent roots. The European crayfish spawns in the early spring, the eggs hatching in May and June. As in all fresh-water crustacea the young are hatched in the form of the parent, there being no metamorphosis,— in other words, development is direct. As in the lobster, if an antenna or leg is lost it is gradually renewed, growing at every molt. For some time after they are hatched the young adhere by the hooked end of their claws to the swimmerets of the mother, and are carried about under cover of her abdomen. During this period the young crayfish are very sluggish, and take no food, being nourished by the food-yolk still persisting in the front part of the body. The European crayfish molts eight times in the course of the first year and five times during its second year; in the third year only twice, that is, in July and September. At a greater age than this the females moult only once and the males twice a year.

The crayfish of the Old World belong to the genus *Astacus,* while those of North America east of the Sierra Nevada belong to the genus *Cambarus,* the latter differing by the absence of gills on the fifth or last pair of legs. An interesting feature in geographical distribution is the occurrence of half a dozen species of the European genus *Astacus* in the streams draining the Pacific Coast from British Columbia to California. East of the Rocky Mountains, from the Great Lakes to Guatemala, there occur between 30 and 40 species of *Cambarus.* These extend to eastern New York west of the Hudson River, and a single species (*C. bartoni*) occurs under stones in certain lakes of northern Maine as also in Lake Champlain and the Great Lakes, extending southward to Kentucky and the District of Columbia.

The presence of the Eurasian *Astacus* on the Pacific Coast indicates their gradual migration from eastern Asia, at a time when Bering Strait was dry land. In certain characters the Amurland and Japanese *Astaci* differ from the Pontocaspian and the west American *Astaci* and approach the *Cambari* of eastern North America. This is also paralleled in the distribution of many plants and insects.

The family to which the crayfish belongs dates as far back as the Jurassic Period, and in Europe *Astaci* first appear in the Upper Cretacean. In North America fossil *Astaci* (*Cambarus primævus*) occur in the Lower Tertiary beds of the western border of Wyoming. Cope discovered fossil *Astaci* in the late Pliocene beds of Idaho. *Astacus* probably originated in western America, since it is found fossil throughout the Tertiary.

Crayfishes are of no little economic importance from the fact that in the course of their extensive fossorial operations they undermine dams, and it is supposed that the inundations of the Mississippi River and the breaks in the levees may be due largely to the mining habits of these animals. For the blind crayfish see CAVE-DWELLING ANIMALS. Consult Fisher, "Crayfish as Crop Destroyers" in 'Year Book of the United States Department of Agriculture' (Washington 1912); Huxley, 'The Crayfish' (London 1887); Hagen, "Monograph of the North American Astacidæ" (in the 'Illustrated Catalogue of the Museum of Comparative Zoology,' No. III, Cambridge 1870); "Revision of the Astacidæ" (in 'Memoirs of the Museum of Comparative Zoölogy,' Vol. X, No. 4, Cambridge, Mass., 1885); and for habits and uses, Rathbun, 'Fishing Industries of the United States' (1884); Sterle, 'The Crayfish of Missouri' (Cincinnati 1902).

CRAYON, Geoffrey, a pseudonym of Washington Irving (q.v.).

CRAYON, a colored pencil consisting of a cylinder of fine pipe-clay colored with a pigment. Black crayons are colored with plumbago or made of Italian black chalk. A white crayon is a cylinder of chalk, common in Europe and America. Red chalk is found in France. It is made from an ochery clay, i.e., one containing much iron oxide. The holder is a porte-crayon. Crayons are said to have been made in France in 1422. It is hard to say how long ago charcoal, chalk and ocherous earths were used. Colored crayons are used for pastel-drawing and are quicker and softer in effect than oils or water colors. Their disadvantage lies in their delicacy; they smudge so easily that it is practically impossible to use them for sketching, and they must be kept under glass. In lithography, a crayon is a composition formed as a pencil and used for drawing upon lithographic stones. It is of a soapy nature, consisting of soap, wax, resins and lampblack, melted, and sometimes burned, together. Pastel is made by mixing chalk and coloring materials with gum water in order to form a paste. The vegetable colors used are tumeric, litmus, saffron and sap green, but should in every case be free from acid, as the latter reacts on the chalk. Vienna white, purified chalk, is also used by artists. Briançon chalk and French chalk are popular names for soapstone, which is very different from chalk in its composition, being a silicate of magnesia.

CRAZY HORSE, a leader of the Southern Sioux, who refused to be confined to the reservations and who made war against the Crows, the Mandan and the whites. He and Sitting Bull were the two foremost leaders of the Sioux War which broke out in 1875. This Indian outbreak was due to several causes, chief of which was the occupancy of the Black Hills by the whites. General Reynolds that same winter surprised the camp of Crazy Horse, but the band succeeded in retreating with comparatively small loss, in a storm. A little later Crazy Horse with a strong band of Sioux and Cheyenne compelled the forces of General Crook to retreat. He then strengthened his band by Indians from the different reservations, which were filled with a seething unrest by his agents. Others from the reservations joined Sitting Bull in Dakota. The forces of the two leaders joined, and under the leadership of Sitting Bull they annihilated the forces of General Custer at the battle of the Little Bighorn River in Montana (25 June 1876). For over a year the united bands held the country in terror. The following winter Gen. Nelson A. Miles marched against them, whereupon the two Indian bands separated. General Mackenzie followed Crazy Horse and defeated his band on the Tongue River, and Miles followed the retreating Indians to the Bighorn Mountains, where he can scarcely be said to have won any victory over them, thanks to the skilful management of Crazy Horse, even though he used artillery against them effectively. However, the pressure on the Indians from all sides became so great that Crazy Horse with 2,000 warriors surrendered the following spring. Suspected of attempting to stir up more trouble he was arrested (7 Sept. 1877). In attempting to escape he was shot by the guard. Consult Hodge, ‹Handbook of American Indians› (Washington 1910); Miles, ‹Personal Recollections› (1896).

CRAZY-WEED, a common name in the prairie States for species of vetch (*Astragalus*) of the pea family. They are herbs with purple or yellowish purple flowers, growing on the prairies from Nebraska and Colorado southward to Texas and New Mexico. They receive the name of crazy-weed from the effect they have upon cattle when eaten by them. Another common name is loco-weed, from which arises a local term for an insanely acting person, who is said to be locoed. The same common names are applied to *Oxytropis lamberti*, which grows northward from Minnesota to British Columbia and south to Texas and New Mexico.

CREAM NUT. See Brazil Nut.

CREAM OF TARTAR, a white, crystalline compound of tartaric acid (q.v.) and potassium. Tartaric acid is dibasic, its molecule containing two atoms of hydrogen that are replaceable by metals. Cream of tartar is the substance that is formed when only one of these typical hydrogen atoms is replaced by potassium; and it is therefore known to chemists as hydrogen potassium tartrate, or acid potassium tartrate, to distinguish it from the normal potassium tartrate, in which both of the typical hydrogen atoms of the acid are replaced by potassium. Cream of tartar is obtained from argol (q.v.), which forms about vats or casks in which wine is undergoing fermentation. The argol is dissolved in hot water and the solution decolorized by albumin or animal charcoal, the cream of tartar being then extracted by evaporation and crystallization, and purified by recrystallization. Cream of tartar is soluble in water, but it does not dissolve as freely as the other familiar compounds of potassium. It constitutes the chief commercial source of tartaric acid and its compounds, and is used in medicine to some extent. The best baking powders consist of cream of tartar mixed with sodium bicarbonate in the proportion of the relative molecular weights of the two substances. These salts do not act upon each other when dry, but when they are moistened they combine to produce the normal tartrate of potassium and sodium, with the formation of water and the liberation of carbon dioxide gas. The formula of cream of tartar is $KH_5C_4O_6$, and that of sodium bicarbonate is $HNaCO_3$. The reaction that occurs is represented by the equation $HNaCO_3+KH_5C_4O_6=H_2O+CO_2+KNaH_4C_4O_6$, the last formula on the right being that of the normal tartrate of sodium and potassium. The carbon dioxide gas that is liberated in the reaction is retained by the dough or batter with which the baking powder is mixed and serves to make it porous, or «light.»

CREAMERIES, Co-operative. See Dairy Industry.

CREAMERY. See Dairy Industry.

CREASOTE, a variant spelling of creosote (q.v.).

CREASY, Sir **Edward Shepherd**, English historian: b. Bexley, Kent, 12 Sept. 1812; d. London, 27 Jan. 1878. He was educated at Eton and Cambridge. He became Fellow of King's College, Cambridge, in 1834; was called to the bar at Lincoln's Inn in 1837. He was for about 20 years a member of the home circuit.

In 1840 he was appointed professor of history at the London University, and in 1860 was knighted and made chief justice of Ceylon. His principal works are 'The Rise and Progress of the British Constitution' (1834); 'The Fifteen Decisive Battles of the World' (1851), a book famous in both England and America. Less known, though still of considerable merit, are his 'Imperial and Colonial Constitutions of the Britannic Empire'; a 'History of the Ottoman Turks' (1854-56); a 'Historical and Critical Account of the Several Invasions of England'; 'The Old Love and the New,' a novel; and a 'History of England' (1869-70).

CREATINE, krē'ạ-tĭn, or **KREATINE**, a crystalline, nitrogenous substance having the formula $C_4H_9N_3O_2 + H_2O$, and known to chemists as «methyl guanido acetic acid.» It exists in the muscular flesh of mammals, birds, reptiles and fishes, and also, in smaller quantities, in brain-tissue and in urine. It may be extracted by chopping up lean muscular flesh (freed from fat), rubbing it with water at about 140° F. and removing the water by pressure. The liquid so obtained is heated on a water bath to coagulate the albumin and then strained. Sub-acetate of lead is added to the filtrate so long as it gives a precipitate, excess of lead is removed by sulphuretted hydrogen and the filtrate is concentrated on a water bath. Crystals of creatine then separate out, the yield being larger if two or three volumes of alcohol are added. The crystals are redissolved, decolorized by filtration through animal charcoal and purified by recrystallization. Creatine crystallizes in monoclinic prisms containing one molecule of water. Its aqueous solution has a bitter taste and is strongly alkaline to litmus. With silver nitrate it gives a white precipitate, which is soluble in caustic potash. If a small quantity of silver nitrate is added to a saturated solution of creatine, together with just sufficient caustic potash to dissolve the precipitate formed, the solution presently solidifies to a transparent gelatinous mass, which, when heated, deposits metallic silver. Creatine is dissolved by strong acids, losing one molecule of water and becoming converted into creatinine. It is also decomposed by boiling with baryta water, yielding sarcosine ($C_3H_7NO_2$) and urea (CH_4N_2O). Creatine may be prepared synthetically by allowing an alcoholic or aqueous solution of sarcosine and cyanamide, $CN.NH_2$, to evaporate spontaneously, crystals of creatine separating out as the evaporation proceeds. See also CREATININE.

CREATININE, or **KREATININE**, a crystalline substance having the chemical formula $C_4H_7N_3O$, and closely allied to creatine (q.v.), from which substance it may be obtained by the removal of one molecule of water by the action of mineral acids or dehydrating agents. It may also be prepared directly from human urine, though, according to Johnson, slight differences exist between the substances obtained from creatine and from urine; for example, both reduce Fehling's solution, but the creatinine prepared directly from urine has a reducing power about 20 per cent greater than that prepared from creatine. Differences in solubility are also said to exist. Creatinine crystallizes in prisms, which may be anhydrous or may contain two molecules of water. It is very soluble in hot water, its solution being neutral to litmus according to some authorities, but alkaline according to others. It forms well-crystallized salts with acids, and in alkaline solution it slowly takes up water and becomes transformed into creatine. Physiologically, creatinine is to be regarded as a derivative from creatine; for, according to Carpenter, «the latter predominates in the juice of flesh, almost to the exclusion of the former, while the former predominates in the urine, almost to the exclusion of the latter.»

CREATION (Lat. *creatio*, from *creare*, to create), The. Creation is the act of creating or bringing into existence, also something created or caused to exist; specifically, the act of bringing into existence the universe, likewise the universe itself. The Old Testament account of the creation contained in Genesis i-ii, 4 (first clause), is received by those who accept the literal authority of the Bible. Genesis ii, 4-7 (second clause), contains, according to many of the later biblical critics, another and quite distinct narrative of the creation. According to the first and generally accepted account, God created the heaven and the earth in the course of six — or, including the rest-day, seven — successive days. On the first day he created light, and called the light day and the darkness night; on the second day he made the firmament and divided the waters; on the third day appeared the dry land, while the waters were gathered together in seas, and plants began to grow upon the earth; on the fourth day the lights were set in the firmament; on the fifth day God created aquatic and bird life; on the sixth day he made land animals and created man. On the seventh day God rested from his work, and from this part of the account came the institution of the Sabbath, as having been hallowed for man by the example and decree of God himself. Various attempts have been made to bring this narrative into harmony with the discoveries and speculations of modern scientific and philosophical thought; but at the present time there appears to be a feeling, as well among scholars as among people at large, that such endeavors can only be unprofitable; while the record of primitive theorizing upon the origin of the world may well be left to tell its own story, however variously interpreted, to the modern mind.

Other ancient cosmogonies have long engaged the attention of students, and in the different early accounts of creation brought to light from the literary and monumental remains of antiquity much valuable material has been found for the study of comparative records bearing upon history and religion. Among the old cosmogonies, that contained in the Babylonian and Assyrian legend of creation is especially interesting, from the points of resemblance between itself and the account above given from the book of Genesis. The two are variously regarded by specialists, some treating them as independent variants of one original tradition or myth, while others hold that the narrative of Genesis is a borrowing from the Babylonian legend.

It is now more than 30 years since the learned world was startled by the announcement that Assyriologists had discovered a remarkable version of the history of the creation, which closely resembled the main narrative of Genesis, and appeared to be based upon the archetype from which one of the earliest editors or writers of the Hexateuch drew many of his statements. The credit of the discovery of the cuneiform creation records in the British Museum belongs, undoubtedly, to Sir Henry Rawlinson. L. W. King, of the British Museum, has continued and completed, as far as is possible, up to the present time, the work begun by Rawlinson. As the result of his labors we are able to form a connected idea of the whole of the Babylonian story of the creation. Formerly only 21 tablets and fragments inscribed with portions of the legend were known, but now no less than 49 separate tablets and fragments have been identified as containing portions of the cuneiform texts of the creation series, and the details of the story can now be followed consecutively.

The great Babylonian poem of creation was divided into seven sections, or tablets, and the whole work was known by the title 'Enuma Elish,' which also forms the opening words of the text. It contained 994 lines. Each of the seven sections contained, on an average, 140 lines, and each section was intended to describe the events of one «day» of creation. It is difficult not to think that such artificial divisions of the legend indicate that we are dealing with a comparatively late recension of it, and this may well be the case when we remember that the oldest copies of it which we possess date from the reign of Assurbanipal (668–626 B.C.); no one who takes the trouble to read the seven tablets and who is familiar with ancient cosmogonies and theogonies will have the slightest doubt that the original form of the Babylonian and Assyrian history of creation is many thousands of years old. It is very probable that the Semitic Babylonians were only the borrowers and not the inventors of this remarkable work.

At the beginning of all things, according to the legend, Apsu and Tiamat were water deities and typified chaos; to these were born Lahmu and Lahamu, and later appeared Anshar and Kishar, and still later Anu and other gods came into being. One of the fragments of the first tablet mentions the birth of Nudimmud (Ea), and shows that Marduk, who is made to take the leading part in the later tablets of creation, was supposed to be in existence, like Mummu and Gaga. In the earlier episodes of the creation story, it is Ea and not Marduk who is the hero, and it was Apsu, a god of chaos, who rebelled against the gods. Apsu disliked the new order of things and the creation of the universe for the simple reason that the beings who formed members of the new world disturbed his peace and rest; as soon as he had made up his mind as to what was likely to happen, he called Mummu, his minister, and with him went to Tiamat and took counsel with her, and complained that «he could get rest neither by day nor by night.» The putting of the house of the world into order by the gods destroyed his peace of mind. Of the conflict which took place between Ea and Apsu and his ally Mummu we know little, but that the great god did not succeed in inflicting a decisive defeat on Apsu and his allies is clear from the fact that, later, Anshar found it necessary to exhort Marduk to do battle with Tiamat. Marduk slew her and split her body into halves. The actual account of the creation of the world by Marduk begins toward the end of the fourth tablet, where it is said that one-half of the body of Tiamat formed a covering for heaven, and that Marduk, having formed E-shara, made the great trinity of Anu, Bel and Ea to dwell therein.

In the fifth tablet we hear of the fixing of the constellations of the zodiac, the founding of the year, etc., and it seems as if this section contained an account of the creation of vegetation. The sixth tablet told the story of the creation of man, and it seems as if Marduk made man with the view both of punishing the gods and of providing a creature who should at all times worship him. Marduk, or Bel, instructed Ea to cut off his (Marduk's) head, and the man was formed out of the blood which flowed from the god's body. Marduk is made to tell Ea that he intends to create man from his own blood and from the «bone» which he will create. The Assyrian word for «bone» is *issimtu*, which is the exact equivalent of the Hebrew *esem*-«bone,» which occurs in Genesis ii, 23, in connection with the account of the creation of woman.

The creation of man was the final act of creation, and when this was accomplished, the gods assembled in their council chamber in Upshukkinaku, with Marduk at their head, and they sung to him a hymn of praise, the text of which forms the seventh section of the creation story and contains 50 addresses to the god. How Marduk managed to survive his decapitation is not told us, and we can only surmise that he met the gods in their council chamber in some sort of spiritual body. The parallels which may be drawn between parts of this legend and the book of Genesis are taken by many scholars to prove that the Jews borrowed large portions of their religious literature from their kinsmen, the Babylonians, and that the seven days of creation were imagined long before the days of Abraham. Consult Johns, C. H. W., 'A short bibliography of works on the Babylonian stories of creation and the flood' (Manchester, England, 1913); Ball, Sir R. S., 'The Earth's Beginning' (New York 1902); Bergson, H., 'Creative Evolution' (New York 1911); Hastings, H. L., 'Was Moses Mistaken? or Creation and Evolution' (Boston 1895); Muss-Arnolt, W., 'The cuneiform account of the Creation and the Deluge' (Chicago 1894); Gridley, A. L., 'The first chapter of Genesis as the rock foundation for science and religion' (Boston 1913).

CREATION OF MAN. See Man, Christian Anthropology.

CREATIONISM. (1) In theology, the doctrine that a soul is specially created for each human fœtus as soon as it is formed in the womb; opposed to Traducianism, which teaches that the souls of children as well as their bodies are begotten by reproduction from the substance of the parents; and to Infusionism, which holds that souls are pre-existent, and that a soul is divinely infused into each human fœtus as soon as it is formed by generation. Many theologians, however, regard the mode of the soul's coming into being as a part of the mystery which envelops the whole subject of the existence and transmission of life. (2) a term for that theory of the origin of man which is opposed to evolutionism (see Evolution); the doctrine of the creation of all things by the Creator's fiat, and not through evolutionary processes.

CRÉBILLON, krā-bē-yôṅ, **Claude Prosper Jolyot de**, French novelist: b. Paris, 14 Feb. 1707; d. there, 12 April 1777. He was the younger son of Prosper Jolyot de Crébillon (q.v.), and succeeded as an author in an age of licentiousness. For his theological allusions in his novels, especially concerning the papal bull ‘Unigenitus,’ he was imprisoned in the Bastile and banished from Paris for five years. By the subtleties with which he excuses licentious principles, Crébillon contributed to diffuse a general corruption of manners, before confined to the higher circles of Parisian society. His own morals, however, appear to have been the opposite of those which he portrayed, and we are told of his cheerfulness, his rectitude of principle and his blameless life. He married Lady Stafford, an English woman, to whom he displayed a fidelity remarkable at this decadent period. Of his works the best are ‘Lettres de la Marquise’ (1732); ‘Tanzai et Néadarné’ (less licentious, but full of now unintelligible allusions); ‘Les egarements du cœur et de l'esprit’ (1736); ‘Le Sopha’ (1745). It is still a disputed point whether he was the author of the ‘Lettres de la Marquise de Pompadour.’ Consult Amanton, C. H., ‘Particularités sur les deux Crébillon’ (Paris 1835).

CRÉBILLON, Prosper Joylot de, French dramatist: b. Dijon, France, 15 Feb. 1674; d. Paris, 17 June 1762. His first piece, ‘La Mort des Enfants de Brute,’ was rejected by the players. His ‘Idoménée’ was brought upon the stage in 1705. The faults of the play were overlooked in consideration of the youth of the author and the promising talent which it displayed, and his talents after the appearance of his ‘Atrée,’ in 1707, were loudly applauded. A taste for unnatural declamation had been excited by Corneille's tragedy, ‘Rodogune,’ and this manner was carried to excess by Crébillon in the ‘Antrée.’ In 1709 appeared his ‘Electre,’ which is as declamatory and as intricate as his earlier plays; yet it suited the taste of the age. His *chef-d'œuvre*, at least according to La Harpe, is his ‘Rhadamiste’ (1711). In eight days the ‘Rhadamiste’ passed through two editions, and Paris and Versailles vied with each other in admiring it. Crébillon had been told that his talent lay in the terrible, and thought, therefore, that he could not exert himself too much in scenes of horror. ‘Xerxes’ (1714) exceeded in this respect all that he had before written, but soon disappeared from the stage. ‘Semiramis’ (1717) was severely censured, but ‘Pyrrhus’ appeared in 1726 and met with a good reception, contrary to the expectation of the author, who, in this work, had abstained from the frightful and the shocking. When Madame de Pompadour wished to humble Voltaire, Crébillon was thought of as a fit instrument for her purpose. The king gave him the office of censor of the police, a yearly pension of 1,000 francs, and an appointment in the library. Thus freed from pecuniary anxiety, he finished his ‘Catiline,’ which was represented in 1749 with all the pomp that the court theatre could display. To make some atonement to the character of Cicero, thought to have been wronged in his ‘Catiline,’ he wrote at 76 the ‘Triumvirate, or the Death of Cicero,’ which was brought upon the stage in his 81st year. The defects of this piece were overlooked, from respect to the age of the author. In general Crébillon shows none of the true elevation of the tragic art, but only an imitation, sometimes a happy one, of the manner struck out by Corneille. He was a man of a proud and independent character, disdained to flatter the great, and passed much of his life in a condition bordering on poverty. In 1731 he became a member of the Academy. His works were edited best by Didot (1812). There is a Life by the Abbé de la Porte, and a fine essay by Brunetiére in ‘Epoques de théatre français.’ Consult Dutrait, ‘Etude sur Crébillon’ (1895); Amaton, C. H., ‘Particularités sur les deux Crebillon’ (1835).

CRÉCHE, krâsh (Fr. «crib,» «manger»), a sort of public nursery where, for a small payment or, as in America, usually for nothing, the children of women who have to go out to work are fed, nursed and taken care of during the work hours of the day.

CRÉCY-EN-PONTHIEU, krâ-sē ŏn pôn-tyėy, or **CRESSY**, a village in the French department of Somme, on the Maye, 12 miles north of Abbeville. Crécy has a 15th century church and is celebrated on account of the brilliant victory obtained here, 26 Aug. 1346, by Edward III, with 40,000 English soldiers, over a French army amounting, according to Froissart, to 100,000 men under the command of the Count of Alençon. In this great battle perished the flower of the French chivalry, as well as the blind king of Bohemia, who was fighting on the side of France. The Black ‘Prince distinguished himself greatly, bore the brunt of the fight, and gained his spurs. After this battle, tradition says, the Black Prince assumed the crest of the slain king of Bohemia, which consisted of three ostrich feathers with the motto *Ich dien*, «I serve,» but this is more than doubtful. The battle of Crécy was one of the first in which cannon were used by English troops. Pop. about 1,400. Consult George, ‘Battles of English History’ (New York 1895); and Oman, ‘History of the Art of War’ (London 1898).

CREDENCE, a small table placed near the altar or communion table, at its south side, on which the bread and wine intended for consecration are placed in readiness. In this connection it is used especially in the Roman Catholic and Episcopal churches. In the Greek Church this is called the *trapesa protheseos*, or simply *prothesis*, but is always placed north of the altar, usually in a structural side-chapel. It was sometimes used in the English Church. The word is generally used to denote a small side table or buffet, on which dishes were placed or kept before meals.

CREDI, krā'dē, **Lorenzo**, Italian artist: b. Florence 1459; d. there, 12 Jan. 1537. He was a fellow pupil of Leonardo da Vinci in the school of Verocchio, and so closely followed his style that some of his copies of Leonardo's works are scarcely to be distinguished from the originals. His ‘Holy Families,’ of which he painted a great number for private collections, are gracefully designed and highly finished. His most esteemed works are a ‘Madonna and Child with Saints Julian and Nicholas,’ now in the Louvre, and the ‘Nativity’ at Florence. Two very fine works are the ‘Annunciation’ and the 'Venus' in the Uffizi. The Metropolitan Museum has a 'Madonna Adoring the Christ Child'; and the Boston Art Museum a beautiful boy's head. He did some sculpture also, being designated by Verocchio to complete his statue of Colleoni.

CREDIT, Economic and Public. In political economy the term credit is used to signify (1) the ability of a person to secure a sum of money or its equivalent on a promise to pay the same sum or its equivalent at some future date; (2) claims for future payment of money or its equivalent. It implies confidence of the creditor in the debtor; and the credit system implies general confidence in people's ability to meet their obligations. Credit may also rest upon the fact that a person possesses readily salable commodities, and the extent of credit may depend in large degree on the volume of such merchandise, though at times personal characteristics greatly influence the line of credit extended or allowed. In a mercantile community credit is used more extensively than in an agricultural community since mercantile capital can be converted into cash more readily than agricultural.

The chief function of credit is the transfering of capital from those who own it to persons who presumably expect to make a profit that exceeds the interest on the loan or in the case of goods sold on time (a disguised loan transaction) an excess of price usually exacted in credit sales. Thus while itself not a productive agent, credit increases the productive power of capital. The modern credit system does not rest on good faith alone but its development through efficient credit institutions and its extensive use in commercial transactions are made possible by means of bonds, drafts, checks, promissory notes, etc., which have been standardized through the intermediation of a credit institution such as a bank. Thus the secondary function of credit is to permit the exchange of commodities without the intervention of coin money. By means of a credit system a comparatively small stock of money can be made to do duty for carrying on a number of different transactions, but it is indispensible for every good system of credit that money be instantly available when required. When credit media of exchange are used, business may be violently disturbed by any doubt cast upon the general solvency of business men, whereupon occurs a sudden contraction of the medium of exchange, with the resultant inability of producers to sell their commodities and a depression in prices. See Crises, Economic.

Public credit is the confidence which men entertain in the ability and disposition of a nation to fulfil its engagements with its creditors, or, in other words, the ability of public bodies to buy supplies or to contract to buy them. As more generally used the term means the borrowing capacity and rate at which money can be secured for the public service. The term is also applied to the general credit of the individuals in a nation. The credit of the government does not always flourish or decline at the same time as private credit, yet there is some correspondence between the two, as general individual confidence can rarely if ever persist in the midst of distrust of the government, and a firm confidence in the government tends to promote a corresponding confidence among citizens. A government is usually supposed not to possess complete public confidence if its securities sell at less than par, though in times of emergency the strongest government might be compelled to accept unfavorable terms for a loan, either by paying exorbitant interest or accepting less than the face value of the obligation in payment. See Debts, Public; Debtor and Creditor, Laws of.

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CREDIT, Instruments of. See Banks and Banking — Commercial Paper.

CREDIT, Letter of, an order given by bankers or others at one place to enable a person to receive money from their agent or agents at another place; when it is an order on more than one person or firm it is known as a circular letter of credit.

CRÉDIT FONCIER, krā'dē' fôṅ'syā', in France and other continental countries, a mode of raising money on land, the peculiarity of which is that the advance must not exceed one-half of the value of the property pledged or hypothecated, and that the repayment of the loan is by an annuity, which includes the interest and part of the principal, terminable at a certain date. Several companies have been established by the government with the privilege of making loans. The movement was initiated by L. Wolowski and was accepted by government decree in 1852. Its name became the «Banque Foncière of Paris.» Similar institutions at Nevers and Marseilles were amalgamated into one under the title of «Crédit Foncier de France.» Consult Wolowski, L., 'De la Mobilisation du Crédit foncier' (in *Revue Wolowski*, Vol. X, p. 241, 1839); Josseau, Chonsky and Delanoy, 'Des Institutions de crédit foncier et agricole dans les principaux Etats de l'Europe' (1851); Girault, A., 'Le Crédit foncier et ses privilèges' (Paris 1889, in *Bulletin* de la Société de législation compareé, 1891, pp. 232–237).

CREDIT INSURANCE. See Insurance, Credit.

CRÉDIT MOBILIER, krā-dē mō-bē'lyā (Fr. krā-dē mō-bē-lēā), a large company, incorporated under the name of Société générale du Crédit Mobilier, in France in 1852, and sanctioned by the then existing government. Its objects were (1) To take in hand and originate trading enterprises of all kinds, on the principle of limited liability. (2) To supersede or buy up trading companies; and to substitute scrip and shares of its own for the shares and bonds of the company. It had at the time of its formation a capital of 60,000,000 francs, and did a very extensive business. In 1855 the directors proposed to issue bonds to the amount of 240,000,000 francs, but financiers feared so large an amount of paper currency, and the issue was forbidden by the government. The prosperity of the company declined after this, and the management changed in 1871.

CRÉDIT MOBILIER OF AMERICA, the source of the most tremendous legislative scandal in American history. The national government in 1864 had chartered a «Union Pacific Railroad,» with $100,000,000 capital, to complete a transcontinental line west from the Missouri River; and offered to assist it by a loan of $16,000 to $48,000 a mile according to location, over $60,000,000 in all, and a land grant of 20,000,000 acres, worth $50,000,000 to $100,000,000. Even this offer attracted no subscribers; it meant building 1,750 miles of road through desert and mountain, at enormous cost of freightage for supplies, with frequent bloody encounters with Indians, and no probable early business to pay dividends. Then a House committee, of which Oakes Ames (q.v.) was a member and probably advised the plan, added an authorization to the railroad to issue its own bonds dollar for dollar with the government's, the former to be first mortgage and the latter second; the bonds might be issued 100 miles in advance of construction. In other words, the government assumed all the risk. Still the stock had no marketable value on its own basis as an investment, but only through the government's offers in excess of probable cost, which made it worth while for capitalists to take up the stock and earn these offers. Mr. Ames, chief of the enterprise, and a few associates, knew that this cost would not be much more than half the government's loan and gift together. To gain possession of the balance, it was decided to form the stockholders of the Union Pacific into a duplicate corporation under another name, as a construction company, to which the railroad company should turn over its bonds and stocks as payment for work and supplies. Thus the Union Pacific would be stripped of everything but its roadbed and equipment, while its double would pay business rates and pocket the remainder. Besides Mr. Ames, the chief managers were Thomas C. Durant, vice-president of the Union Pacific (John A. Dix being president), Cornelius S. Bushnell and John B. Alley. They and their associates bought up a moribund Philadelphia concern called the «Pennsylvania Fiscal Agency,» chartered in 1859 and organized as a loan and contract company in 1863, and rebaptized it the «Crédit Mobilier of America,» oddly, as its French prototype was bankrupt and not in good savor. The Union Pacific stockholders took the same amount of stock in it as in the road. The history of the details by which it accomplished the objects of its being cannot be given here. In 1866 the government extended its offer to such mileage as the Central Pacific should build east from its California lines, and the two companies began a race to secure the benefits. Probably the Central Pacific gained as much profit as the Crédit Mobilier, but that was legitimately earned for its stockholders; and even the Crédit Mobilier's action would have been less obnoxious but for the collusion of government directors and public representatives. The net result was that the nation paid $94,650,287.28, and the Crédit Mobilier $50,720,958.94, leaving a profit of $43,929,328.34, counting at par the stock and bonds with which the Crédit Mobilier paid itself; on the statement of the trustees, they realized only $23,366,319.81 in cash. But this was certainly much understated; and even so, it was all gained in two years, to December 1868. But the rise of Crédit Mobilier stock in a few months from five cents on the dollar to three or four hundred and then out of the market, the payment of over 500 per cent a year dividends, the knowledge that there was only one place they could come from, and the inference that the government trustees must be incompetent or worse, aroused suspicious excitement. Then the promoters began to quarrel bitterly over the division of spoils, and to sue each other, and one of them came within an ace of exposing the whole, and outsiders demanded a share as the price of silence or assistance. The Crédit Mobilier needed additional legislation, and procured it by «special legal expenses»; and in the latter part of 1867 the suit of an outsider, H. S. McComb, to obtain stock to which he alleged a claim, laid the mine for the final explosion. Representative Elihu B. Washburne of Illinois had moved an investigation and the fixing of transportation rates, and in alarm Mr. Ames (also a representative) came to Washington with 343 shares of stock, then commanding 100 per cent premium, but which he sold to congressmen and leading government officials at par. In a phrase that became classic, he afterward said that he had put the stock «where it would do the most good.» McComb asserted his right to 375 shares, and to quiet him Mr. Ames, in February, 1868, told him the names of the public men to whom he had «sold» the stock. McComb bided his time, and in the presidential campaign of 1872 published those names, or what he alleged to be those; but he added others, or was misinformed, as some of the accused had perfectly clean hands. The list was shocking: the Vice-President of the United States (Colfax), the Vice-President-elect (Wilson), the speaker of the House (Blaine), and many other eminent names. When the third session of the 42d Congress opened in December 1872, the speaker descended to the floor and demanded a committee of investigation containing a majority of his political opponents; which was appointed, with Luke P. Poland of Vermont as chairman. It made a report 18 Feb. 1873, which proved that the speaker had been offered the stock but had refused to touch it, as had Conkling, Bayard, Boutwell and others. Some had taken it but returned it when lawsuits were threatened, without retaining the dividends; some kept it and justified it openly as a business investment; some kept it and the dividends till investigation was imminent and possibly kept the dividends altogether, a few kept both and attempted to deny or explain away the ownership. The report recommended the expulsion of Oakes Ames for using the stock to influence the votes of members of Congress; and of James Brooks, a government director of the Union Pacific, for using his position to obtain stock for himself or his family. The vote on the report was deferred for a week, and the House merely censured both, who by a strange coincidence died shortly after, only a week apart. In the Senate, an investigating committee recommended the expulsion of Senator Pomeroy of Kansas, but no action was taken upon it. Consult Crawford, 'The Crédit Mobilier of America' (1880); Hazard, same title (1881), paper before the Rhode Island Historical Society; *Scribner's Magazine*, 'The Crédit Mobilier' (March 1874).

CREDITORS. See Corporations, Legal.

CREDITS. See Banks and Banking — The Functions of Banks; World's Systems and International Banking.

CREE (krē) **INDIANS,** a tribe of North American Indians of Algonquian stock, living on several reservations in Manitoba and Assiniboia, near Lake Winnipeg and the Saskatchewan River. The tribe numbers about 10,000. They are on friendly terms with the Assiniboin, but until brought under governmental control were constantly at war with the Sioux and Blackfeet. Their bands are commonly grouped in two main divisions: Plain and Wood Crees. After obtaining firearms, they began to harass weaker Athabascan tribes, as far as the Great Slave Lake and the Rocky Mountains, but retired to their present position. (See Algonquian). Consult Skinner, 'Notes on the Eastern Cree and Northern Saulteaux' (American Museum of Natural History, 1911).

CREECH, Thomas, English classical scholar: b. Blandford, Dorsetshire, 1659; d. Oxford, June 1700. He was educated at Wadham College, Oxford, elected Fellow of All Saints College in 1683, and was head master of Sherborne School from 1694–96. He returned to Oxford, and in a fit of melancholy committed suicide. He owes his fame almost exclusively to his translation of Lucretius, the poetical merit of which is not very great, although, in the versification of the argumentative and mechanical parts, considerable skill is exhibited. As an editor of Lucretius, he is chiefly valuable for his explanation of the Epicurean philosophy, for which, however, he was largely indebted to Gassendi. He translated also the elegies of Ovid, two eclogues of Virgil, some of Plutarch's 'Lives,' Theocritus, thirteenth satire of Juvenal, etc.

CREED. See Creeds and Confessions.

CREEDE, Colo., town and county-seat of Mineral County, on the Denver and Rio Grande Railroad; 35 miles northwest of Del Norte, and 165 miles southwest of Denver. It is in a narrow gulch on Willow Creek, high up among the mountains, and is engaged exclusively in mining, having been formerly noted for its highly productive silver mines. Since 1903, however, the mining of lead and zinc has been more profitable. Wagon Wheel Gap, Hot Springs and Antelope Springs are of scenic interest and make the region attractive for students. It is named after N. C. Creede, who staked the first claims here in 1889. Nearly destroyed by fire in 1892, it was rebuilt and has public schools, weekly newspapers and a national bank. Pop. 741.

CREEDMOOR, a rifle range belonging to the State of New York, located near Queen's station on the Long Island Railroad, just within the boundaries of Greater New York. Each regiment of the 1st and 2d brigades of the National Guard is required to practise at Creedmoor at stated times. The range extends over 85 acres, has 30 targets and can be used at any distance from 50 to 1,200 yards. The range was founded as a private enterprise by the National Rifle Association and was later acquired by the State. Creedmoor village is the seat of a State insane asylum. Pop. 600.

CREEDS AND CONFESSIONS (Lat. *credo,* «I believe»; *confessio* «I confess»), formularies of religious doctrine, rules, symbols or testimonies of faith for public use, setting forth with authority articles of belief which are regarded by the different Christian sects as necessary for salvation.

Of these formularies, the earliest is the Apostles' Creed which developed from the confession of Peter, Matthew xvi, 16, and from the baptismal invocation which determined the trinitarian order and arrangement. Out of the controversies which arose over differences of opinion on doctrinal points came the creeds of ecumenical councils of bishops; the Nicene Creed, A.D. 325; and the Creed of Chalcedon, A.D. 451. Between these two, about 430, appeared the Athanasian Creed, attributed to Athanasius, bishop of Alexandria (d. 372). The early existence of the Apostles' Creed is inferred from a passage in the work 'Against Heresies,' written by Saint Irenæus, who died about 202, being then 60 or perhaps 80 years old. The order in which the topics of the Apostles' Creed occur in the passage gives force to the conjecture based on its phraseology. Irenæus says of the Christians of his day: «All teach one and the same *God the Father,* and believe the same œconomy of the *incarnation of the Son of God,* and know the same gift of the *Spirit,* and meditate on the same precepts, and maintain the same form of constitution with respect to the *Church,* and look for the same *coming* of the Lord, and wait for the same *salvation* of the whole man — that is, of the soul and *body.*» Rufinus, who lived in the latter half of the 4th century, gives us the «symbol» of the apostles as it was received by the Roman Church of his time; it is shorter than the form that is now current, but it contains nearly all the articles of the now existing creed and in the same words and the same order. In 870 the Eastern or Greek Church under Photius, archbishop of Constantinople, separated from the Western or Mother Church of Rome, over the insertion of *filioque* — and the Son — in the Creed, two and half centuries before at the Council of Toledo, Spain, held in 589. The doctrinal system of the Greek Church underwent no further change, but the Reformation called forth a number of confessions or doctrinal manifestoes against Protestantism and some against the Church of Rome; namely, the Confessions of Gennadius, A.D. 1453; the answers of the Patriarch Jeremiah to the Lutherans, A.D. 1576; the Confessions of Metrophanes Critopulos, A.D. 1625; the Confession of Cyril Lucar, A.D. 1631; the Orthodox Confession of Mogilas, A.D. 1643; and the Confession of Dositheus, A.D. 1672. Other Eastern Christian sects with slight differences of creeds comprise Nestorians, Jacobites, Copts, Armenians. In 1517 Luther's protest over abuses in Church practice initiated both the Protestant Reformation and the Catholic Counter-Reformation and almost contemporaneous with the Tridentine standards of the Council of Trent 1545–63 confirming points of Catholic doctrine, from 1530 to 1577 appeared numerous Protestant Evangelical Confessions of Faith. The first of them, the Augsburg Confession («Confessio Augustana») drawn up by Melanchthon and presented to the Emperor Charles V at Augsburg in 1530, is the most authoritative exposition of the Lutheran tenets; it was added to, explained or modified by other similar documents, as the 'Apologia Confessionis Augustanæ' (also by Melanchthon), a defense of the Confession of Augsburg; the Smalkald Articles (1536), drawn up by Luther; and the Formula of Concord, designed to reconcile differences among the Lutherans and to check a movement toward Calvinism. The chief confessions of faith formulated by the «Reformed,» as distinguished from the followers of Luther are the 'Confessio Tetrapolitana' (confession of the four towns, namely, Strassburg, Constance, Meiningen and Landau), and two or three other confessions. These all preceded the Calvinian Confessions, but they contain tenets near allied to those of Calvinism and Presbyterianism. Then came the confessions drawn up by John Calvin or under his influence, the first of these, 'Consensus Tigurinus' (the Zürich agreement), drawn up by Calvin himself, was designed to bring the followers of Zwingli and of Calvin into one communion; the others were the Gallic (or French), the Belgic (or Dutch), and a second Helvetic (or Swiss) confession. These were followed about 50 years after the latest of them, by the celebrated Decrees of the Synod of Dordrecht (1619). The Articles of the Protestant Episcopal or Church of England's faith were, when first promulgated (1552), 42 in number, but later that number was reduced to 39. In 1646 was published the Westminster Confession of Faith by the Presbyterian divines of England, Scotland and New England, which in the year 1903 underwent amendment by vote of the Presbyterian churches of the United States. (See CANON LAW; CHRISTIAN DOCTRINE, DEVELOPMENT OF; CHRISTOLOGY; REFORMATION; COUNTER-REFORMATION; and separate articles on different creeds and confessions). For further creeds of modern evangelical denominations consult Schaff, P., 'Creeds of Christendom,' (3 vols., New York 1877); also Curtis, W. A., 'A history of creeds and confessions of faith in Christendom and beyond, with historical tables' (Edinburgh 1911); Briggs, C. A., 'The fundamental Christian faith; the origin, history and interpretation of the Apostles' and Nicene creeds' (New York 1913); Dix, M., 'The Creed: a full and sufficient statement of the Christian faith' (New York 1905); Skrine, J. H., 'Creed and the Creeds, their function in religion' (London 1911).

CREEKS (named for the same reason as or in translation from their Algonquin name, Muskoki, «creeks,» from their many-rivered land), a once powerful confederacy of Gulf Indians, the strongest Indian power south of New York, except the Cherokees. They occupied a large part of Georgia and Alabama, and formed the largest section of the Muskhogean stock. The Muskogi were the dominant tribe, and their language the *lingua franca* of the confederacy; others at the outset were the Coosa, Kasihta, Kawita (Coweta), etc.; later came in the Alibamu, Hitchiti, Kosati, Yamasi (Yemassee), Yuchi or Uchee, Natchez and others, and a band of Shawanoes had been incorporated by desire or force. The Seminoles («wanderers») of Florida had broken away from them. They numbered probably 30,000 at their highest. Lying between the English spheres in Georgia, the Spanish in Florida, and the French at Mobile, and in Louisiana, each power bid for their support, and they shifted from side to side; but the destruction of the French power and the cession of Florida 1763–83, left the English supreme. In 1763 they had 5,860 warriors and 50 towns; the latter of log houses plastered outside with clay, and as with all the Southern tribes, built in an oblong with a space in the centre for public ceremonials, like the classic forum or agora. Their head chief was called mico, besides whom they had a war chief; no chiefs seem ever to have been deposed, but new ones added, and at last they became so burdensome that their number was limited to 500. In the Revolution the Creeks took the English side, and after it many Southern Tories took refuge among them and kept them stirred up to hostility; Congress had determined on war, but in 1790 the chiefs were induced to visit New York, and made peace for both Upper and Lower Creeks and Seminoles. This did not prevent attempted raids on Nashville and Knoxville 1792–93. A number of treaties were made with them involving cessions of land in the years after 1786; and from 1800 on, a number of them settled in Louisiana, and later in Texas, where they remained on a reservation till reunited with the others in 1872. In the War of 1812 the English induced one section of them to rise against the Americans, and they perpetrated the massacre of Fort Mimms, 30 Aug. 1813; but American vengeance fell on innocent and guilty alike, and the main fighting force was finally defeated and slaughtered out at Horseshoe Bend, 29 March 1814. Over 2,000 warriors had been killed and their lands ravaged and towns burnt, and they submitted. This gave an impetus to the Georgian impatience to have Congress fulfil its promises of buying up the Indian titles and deporting the tribes; but the obstinate refusal of the tribes to consent led to trickery and violence to obtain the result. (See CHEROKEE; CHEROKEE NATION *v.* GEORGIA). The party of consent made a treaty 12 Feb. 1825, ceding all their Georgia and part of their Alabama lands for equivalent lands in Indian Territory and $400,000 in cash; it was made through their chief, William McIntosh, who was at once put to death according to their law. But by a treaty of 24 Jan. 1826, at Indian Springs, the complying party ceded most of their Georgia lands, and by 1828 the other section had been bought over to ratify it. In 1836 some of the Creeks joined the United States forces against the Seminoles, but others began raiding Georgia and Alabama villages. Scott reduced them, and the government at once began deporting them to the Arkansas; 24,594 were removed, and 744 left behind. The government tried to Christianize and civilize them, but they fiercely refused either missionaries or schools; especially Christianity, which to them was a badge of their negro slaves. In 1857 they numbered 14,888. In the Civil War they divided, and after three battles the Confederate section drove the other into Kansas, where many perished, and 1,000 entered the United States army. After the war they were forced to cede 3,000,000 acres of land, for $975,000. Their government is the same as that of the Cherokees. The number in 1915 was 6,873 of Indian blood. The entire «nation,» white, negro and Indian, numbered in 1915, 18,776. At that date the total area of the Creek Nation was 3,079,095 acres, of which 16,016 acres were reserved for town sites, railroad rights of way and other purposes; 2,997,114 acres were allotted to 18,172 citizens and freedmen; and 63,470 acres were sold. The tribal affairs of the Creek Nation, with the exception of the completion of equalization payments had been disposed of, and the former nation was incorporated in the United States.

CREELMAN, George Christie, Canadian educator: b. Collingwood, Ontario, 9 May 1869. He was educated at the Collegiate Institute, Collingwood, the universities of Toronto, Cornell and Wisconsin, and Michigan Agricultural College. He was assistant professor of biology at Mississippi Agricultural College 1889–92, and held the professorship from 1892–97. He was superintendent of the Farmers' Institutes of Ontario from 1897–1904, and since the latter year has been president of the Ontario Agricultural College, Guelph.

CREELMAN, James, American war correspondent and journalist: b. Montreal, Canada, 12 Nov. 1859; d. 12 Feb. 1915. He entered the service of the New York *Herald* in 1877; was an editorial writer and correspondent 1877–89; editor of the London edition 1890, and of the Paris edition 1891–92, when he became editor of the New York *Evening Telegram.* He represented the New York *World* in the China-Japanese War of 1894; the New York *Journal* in the Græco-Turkish War 1897, the Spanish-American War 1898, where his gallant conduct met with wide and well-deserved recognition, and the Philippine insurrection 1899. He was a volunteer aide on General Lawton's staff in the Philippines. From 1900 to 1906 he was a special and editorial writer on the New York *World,* and from 1906 to 1910 was associate editor of *Pearson's Magazine.* He was a member of the New York board of Education (1911–12), and president of the Municipal Civil Service Commission (1911–13); and during the following years covered important political assignments for the *Evening Mail* and the New York *American.* He has published ‹On the Great Highway› (1901) an account of his travels as a correspondent; ‹Eagle Blood› (1902), a novel.

CREEPER, a local name of a variety of small birds. The term is usually distinguished by prefixes, but most frequently used for the tree-creepers (*Certhiidæ*). With the one exception all of the 12 or 14 species and 5 genera are confined to the Old World, those of Africa and Australia being less typical than the north temperate *Certhia.* The common or brown creeper (*Certhia familiaris*) has a slender curved bill, strong feet with short tarsi, 12 stiff, acuminate tail feathers, and brown plumage streaked with white. In a number of varieties it occurs in temperate North America and Europe, breeding mostly to the north. It is a common little bird in open woodlands. Encircling trees spirally from the base upward, it clings to the bark in the manner of woodpeckers by means of the feet, aided by the stiff tail feathers, and picks insects and their eggs from the crevices with its sharp bill and slender exsertile tongue.

CREFELD. See Krefeld.

CREIGHTON, krā'ton, **James Edwin,** Canadian-American philosopher, teacher and writer: b. Pictou, N. S., 8 April 1861, graduated from Dalhousie College 1877, and studied philosophy at Cornell University and at the universities of Leipzig and Berlin; Ph.D. Cornell University 1892, LL.D. Queens University 1903; Sage professor of logic and metaphysics in Cornell University since 1895; editor *The Philosophical Review* and American editor ‹Kant-Studien.› He was the first president of the American Philosophical Society, which was organized in 1902. He has published ‹An Introductory Logic› (1898), been a frequent contributor to philosophical journals, and made important translations from the German.

CREIGHTON, Louise von Glehn, English historian: b. Sydenham, England, 7 July 1850. In 1872 she was married to Rev. Mandell Creighton (q.v.), then rector of Embleton, Northumberland, but subsequently bishop of Peterborough 1891–97, and bishop of London 1897–1901. She is the author of lives of the Black Prince, Sir Walter Raleigh and the Duke of Marlborough, in Longman's ‹Historical Biographies›; ‹England a Continental Power›; ‹Social History of England›; ‹Government of England›; ‹First History of England›; ‹First History of France›; ‹Heroes of European History›; and edited her husband's ‹Life and Letters.›

CREIGHTON, Mandell, English Anglican prelate and historian: b. Carlisle, 5 July 1843; d. Fulham, London, 14 Jan. 1901. He was educated at Merton College, Oxford; ordained deacon in 1870, and priest in 1873. He was vicar of Embleton, Northumberland, 1874–84, and in the latter year was elected to the Dixie professorship of ecclesiastical history at Cambridge, being the first occupant of the chair. In 1885 he became canon residentiary of Worcester Cathedral, but in 1891, on his appointment as bishop of Peterborough vacated both that post and his professorship. He also became Privy Councillor. In 1897, he was appointed bishop of London. The most important of his numerous historical works is his ‹History of the Papacy During the Reformation› (1882–94). Other publications of his include ‹Primer of Roman History› (1875); ‹Life of Simon de Montfort› (1876); ‹The Age of Elizabeth› (1876); ‹The Tudors and the Reformation› (1876); ‹Cardinal Wolsey› (1884); ‹Carlisle› (1889); ‹The Early Renaissance in England› (1895); ‹The English National Character› (1896); ‹Story of Some English Shires› (1897); ‹Persecution and Tolerance›; ‹Counsels for Church People›; ‹Historical Essays and

Reviews' (1902). He founded the 'English Historical Review' in 1886, and acted as editor till 1891. At the 250th anniversary of Harvard University in 1886, he represented Emmanuel College, Cambridge. Consult his wife's 'Life and Letters of Mandell Creighton' (2 vols., London 1903, new ed., 1913).

CREIZENACH, krī'tsĕ-naн, **Theodor Adolf,** German poet and literary historian: b. Mainz, 16 April 1818; d. 5 Dec. 1877. He was educated at Giessen, Göttingen and Heidelberg, and was prominent among the Jews in Frankfort until his conversion to Christianity in 1854. After that time he taught in the public schools in Frankfort, becoming professor of history and literature at the gymnasium in 1863. He wrote poems published in two volumes (1838 and 1848) and edited the letters of Goethe and Marianne von Willemer.

CREMA, krā'mä, Italy, episcopal city in Lombardy, province Cremona, in a beautiful plain on the left bank of the Serio, 25 miles east of Milan. It was founded about 570 by the Lombards, and was destroyed in 1159 by Frederick Barbarossa, for taking part with the Guelfs. It was rebuilt in 1185. It is now a well-built town, enclosed by a brick wall and a ditch, and containing an old castle, a cathedral dating from the middle of the 14th century, a picture gallery and several educational institutions. Chief products of the district are wine, fruit, flax, hemp, rice and cheese; lace, silk and linen goods are manufactured here, which are famous throughout Europe. Pop. 11,411.

CREMATION OF THE DEAD, the practice of disposing of the bodies of the dead by reducing them to ashes, instead of by burial. The custom is of ancient origin, and has been revived in modern times. In Greece burial was practised through the 5th century B.C., but with the spread of belief in a future life and the need of purification by fire, cremation became common. It was the Roman custom also, and only with Christianity did earth-burial become the rule in European civilization. Within the last few decades the conviction has spread that a more rapid and sanitary method of disposal must be substituted for burial, especially in the great centres of population. To find enough land for burial purposes is becoming a more and more difficult matter. If 4,000 corpses are crowded into an acre, and a mortality rate of 15 per 1,000 be assumed, then nearly four acres per 1,000,000 population are required annually to bury the dead. A computation of population, death rate and space required for burial will show that unless the custom is changed, much of the available space in the vicinity of all large cities will eventually be required for burial purposes. The sanitary objections to burial are of still greater importance than the economic difficulties. Eminent scientists advocate that while cremation remain optional for ordinary cases, it should be made obligatory when death is due to such transmissible diseases as smallpox, diphtheria, scarlet fever, typhoid fever and tuberculosis. In cases of epidemics and after battles, when large numbers of bodies are to be disposed of at once, cremation is deemed especially advisable. It is also pointed out by the advocates of cremation that where burial is resorted to, even though the cemetery be located at a distance from dwellings, there must be contamination of the water and the air, because they are the only means of carrying off the products of dissolution. In these days of reaching out for streams to supply reservoirs for cities and towns, it becomes a difficult problem to ensure protection of the water supply from burials in the same watershed.

An objection to cremation, in the minds of some, is that trace of the dead is obliterated from the sight of the living. Aside from this sentimental objection, the chief argument against cremation is the medico-legal one, that with the burning of the body possible traces of crime are obliterated. Frederick L. Hoffman, in a paper on 'Cremation as a Life Insurance Problem' (*Sanitarian* for January 1901), calls attention to this phase of the subject and points out that 64 of the 528 persons cremated at Saint Louis, Mo., in 1895–99 died from accidents, violence or suicide. In view of the number of murders, by poison or otherwise, that are committed to obtain insurance money, it is recommended that very special precautions be taken to ascertain the exact cause of death before issuing a permit for cremation. In 1873 there was a strong agitation in New York, more or less echoed in other parts of the United States, in favor of cremation, and the newspapers published numerous opinions of eminent physicians and others to the effect that burial grounds were an injury to the health of the living, especially in populous sections. There was a similar movement in the leading countries of Europe about the same time. In 1876 Dr. F. Julius LeMoyne established the first crematory in the United States, at Washington, Pa., the first incineration being that of the body of Baron de Palin, in December of that year. This was a semi-private institution, the first thrown open to the general public in this country being the Fresh Pond crematory, operated by the United States Cremation Company of New York. Others were built in leading cities, there being a total of 24 at the close of the year 1900.

There are now crematories at the following places: Ancon, Panama; Baltimore, Md.: Boston, Mass.; Buffalo, N. Y.; Cambridge, Mass.; Chicago, Ill.; Cincinnati, Ohio; Cleveland, Ohio; Davenport, Iowa; Denver, Colo.; Detroit, Mich.; Fort Wayne, Ind.; Fresno, Cal.; Honolulu, Hawaii; Indianapolis, Ind.; Lancaster, Pa.; Linden, N. J.; Los Angeles, Cal.; Middletown, Conn.; Milwaukee, Wis.; Minneapolis, Minn.; Montreal, Canada; New York, N. Y.; North Bergen, N. J.; Oakland, Cal.; Omaha, Neb.; Pasadena, Cal.; Philadelphia, Pa.; Pittsburgh, Pa.; Portland, Ore.; Rochester, N. Y.; Sacramento, Cal.; San Diego, Cal.; San Francisco, Cal.; Seattle, Wash.; Spokane, Wash.; Springfield, Mass.; Saint Louis, Mo.; Saint Paul, Minn.; Tacoma, Wash.; Troy, N. Y.; Vancouver, B. C.; Washington, D. C.; Washington, Pa.; Waterville, N. Y.

The total number of cremations, distributed among these 45 crematories, had risen to 86,006 at the end of 1913, the last year for which statistics are available. The total for the year 1913 alone reached 10,183.

In the earlier furnaces body and coffin were burned separately, but in the latest furnaces the remains are incinerated in the casket, without handling, as received. A chapel is connected with the crematorium, where services may be held if desired. The casket is then lowered into the incinerating room, and, after metal handles and name plate are removed, introduced into the retort. The heat is so intense that after a few hours only the ashes of the bones remain, all else, including the structure of the casket, having disappeared in light ash or gaseous products. Screws and nails are removed by a magnet, and about four pounds of pure ash remain. This is placed in a metallic receptacle, labeled and sealed.

Bibliography.— A chapter on cremation, treating the subject from the sanitary and economic standpoint, is contained in Baker, ‹Municipal Engineering and Sanitation› (New York 1901); Cobb, ‹Quarter Century of Cremation in North America› (Boston 1901), includes a complete history and statistics of the movement in the United States, with brief supplementary matter and tables for Europe. The book also contains a full bibliography of the subject. Freeman, ‹Crematoria in Great Britain and Abroad› (London 1906), contains descriptions with diagrams and illustrations of some of the principal crematoria of the world. An introductory chapter contains an historical sketch. The *Sunny Side*, an undertakers' trade publication, contains a department devoted to cremation news and propaganda.

CREMAZIE, krā'mä'zē,' **Octave,** French-Canadian poet-bookseller: b. Quebec, 16 April 1827; d. Havre 1879. He was educated at the Seminary of Quebec and became associated with his brothers in a bookselling business, which, however, was unsuccessful, and in 1862 financial involvements led him to seek refuge in France, and he lived there under an assumed name. His poems, which are inspired by an intense religious and patriotic sentiment, began to be published in 1854. His complete works were published in Montreal in 1882. He has been called «the father of French-Canadian poetry.»

CREMER, krā'mėr, **Jacobus Jan,** Dutch novelist: b. Arnheim, 1 Sept. 1827; d. The Hague, 5 June 1880. He was a painter, but forsook the pencil for the pen. His series of ‹Stories of Betuwe› (a rural district) are specimens of idiomatic expression, faithful portraiture and unsophisticated humor. The same traits distinguish all his works, ‹Daniel Sils› (1856); ‹Anna Rooze› (1867); ‹Doctor Helmond and His Wife› (1869), etc.; but he is at his best amid rural scenes. He published a volume of ‹Poems› (1873). For biography consult Brinks, J., ‹Geschiedenis der Noord-Nederlandesche Letteren› (1887–89).

CREMER, William Randal, English advocate of international peace: b. Fareham 1838; d. 1908. He was prominent in English trade-unions in 1860–70. In 1885, as a Liberal, he entered the House of Commons, to which he was re-elected in 1886, 1892, 1900 and 1906. To further the cause of universal peace he founded in 1887 the Inter-Parliamentary Conferences which have met since 1888 at frequent intervals. He visited the United States repeatedly in the interest of an Anglo-American treaty of arbitration and in support of the International Arbitration League, of which he was secretary for 37 years, he journeyed through all Europe. He also edited the *Arbitrator*, a monthly devoted to the cause of peace. The Nobel peace prize, which was awarded to him in 1903, he gave as an endowment to the International Arbitration League.

CRÉMIEUX, krā-mē-ė, **Isaac Moïse,** French jurist and politician: b. Nîmes, 30 April 1796; d. Passy, 10 Feb. 1880. He became an advocate in Paris in 1830; in 1842 entered the Chamber, and in 1848 was a member of the provisional government. Imprisoned at the *coup d'état*, he subsequently confined himself to professional work till 1870, when he was a member of the government of national defense. He was made a senator in 1876, and was the founder of the Alliance Israélite Universelle.

CREMNITZ. See KREMNITZ.

CREMONA, krā-mō'nä, Italy, city and capital of province of same name, on a plain on the left bank of the Po, 47 miles south of Milan. It is surrounded by walls and wet ditches, and defended by a citadel. It has broad but irregular streets and attractive public squares, and a bridge 3,100 feet long over the Po. The most remarkable edifice is the cathedral, begun in 1107 and completed about 1491. It exhibits little harmony of parts, but has a venerable and imposing appearance, and its interior decorations are of the most costly description. Others of its 44 (formerly 87) churches are the richly decorated 16th century San Pietro al Po; San Agostino e Giacomo in Braida, with paintings by Perugino; Sant' Agata; Santa Margherita. Also noteworthy are the city hall, and the 13th century Palazzo de' Gonfalonieri, and the Palazzo Reale, with natural history and other collections. Close by, and connected with the cathedral, is the Torazzo, a Gothic clock tower, 397 feet high, built of brick and having 490 steps to the bell-story. Cremona has a seminary, a lyceum, a gymnasium, a school of industrial art, a school for voice culture, a technical school, two theatres, a library of 100,000 volumes and a chamber of commerce. The town markets grain, flax, cheese, etc., and manufactures linen, wool, machinery, silk, earthenware, colors and mustard, the latter of which is much esteemed in Italy. It was at one time celebrated for its violins. Their manufacture was almost wholly confined, for nearly 100 years, to a family of the name of Amati. Antonius Stradivarius and Joseph Guarnerius were also celebrated violin-makers of Cremona. A memorial tablet marks the house where Stradivarius made his violins. Cremona was also famous for its painters, Boccaccio, the founder of the Cremona School, Melone, Bembo, the three Campis and Sofonisba d'Angussola, whose five sisters also practised the art.

Cremona was colonized by the Romans 219 B.C. and again 190 B.C., and became a populous and flourishing town. In the war between Vitellius and Vespasian it was plundered and burned by the troops of the latter, but was subsequently rebuilt by Vespasian. After the fall of the empire it eventually fell under the dominion of the Visconti of Milan. In 1796 it was taken possession of by the French, and was included in the Cis-Alpine Republic, and afterward, from 1800 to 1814, in the kingdom of Italy under Napoleon. Consult Robaloth, ‹Cremona e sua provincia› (Milan 1859);

‘Guida di Cremona’ (Cremona 1904). Pop. 40,436.

CRENELLE, an opening in an embattled parapet; a loop-hole or embrasure through which to shoot. It is sometimes used to designate a battlement.

CRENIC ACID, a vegetable acid having the formula $C_{12}H_{12}O_8$, said to exist in vegetable mold, and in marshes, peat bogs and the deposits thrown down by ferruginous waters. It is pale yellow in color, and uncrystallizable.

CREODONTA, krē-ō-dŏn'tạ, an extinct suborder of the carnivora (q.v.), distinguished by many primitive characters, and especially by the fact that the scaphoid and lunar bones of the wrist are separate instead of united into a single bone as in modern carnivora. In all modern land carnivores the last premolar tooth in the upper jaw and first true molar in the lower jaw are enlarged and peculiarly adapted to cutting flesh (hence called «carnassials»), working against each other like a pair of shears. This is also the case with one group of the *Creodonta*, from which the modern carnivora are descended. But in most creodonts there is no specialized carnassial, or it is developed from other teeth; these groups evolved on lines similar to the true carnivora, but have left no descendants. One group, the arctocyons, resembled the bears, with omnivorous teeth, plantigrade feet, and large compressed claws. Another group (*Mesonyx*, *Pachyæna*, etc.) resembled rather the hyenas, with large strong teeth fitted for bone-crushing and digitigrade feet. Others had the teeth more especially adapted to cutting flesh, the first upper and second lower molar being developed into carnassials in *Oxyæna* and *Patriofelis*, the second upper and third lower molar in *Hyænodon*. Besides these larger forms from the size of a polar bear to that of a prairie wolf, there was a great variety of smaller creodonts, some more or less transitional to the primates, others to the insectivores. The early creodonts appear to represent most nearly the central stock from which most, if not all, of the modern mammals are descended (see CONDYLARTHRA). Creodonts were the dominant carnivora of the Eocene epoch, and a few survived into the Oligocene, when their place was taken by the true carnivora of more modern type. The evolution in the creodonts and true carnivores of carnassials of remarkably similar form, out of different pairs of teeth originally much less alike, is an excellent instance of «convergence» in evolution.

CREOLE, a person born in America or the West India Islands, of pure European blood; as a Spanish creole. The term is sometimes applied, but wrongly, to any person born within tropical latitudes, of whatsoever color. In South and Central America the creoles enjoy high social privileges, and a creole nobility long existed in Venezuela. They are sallow, finely formed and dark-eyed. Creole dialects are an interesting example of broken-down grammar. By English writers it has sometimes been used to mean a mestizo or mulatto; but it cannot properly be applied to any person of mixed race, non-Latin stock or non-European birth. Consult Thomas, ‘Theory and Practice of Creole Grammar’ (1869).

CREOLE CASE, 1841–42, one of the landmarks of the anti-slavery struggle. On 27 Oct. 1841 the brig *Creole* sailed from Hampton Roads to New Orleans with 130 slaves; on 17 November 17 of them rose and overpowered the crew, killed one of the owners, and ran the vessel into the English port of Nassau. The authorities, as wont, imprisoned those directly charged with mutiny and murder, and let the rest go. Webster, then Secretary of State, demanded from England the surrender of the whole, as being legal property of a State under the Constitution, engaged on a legal voyage (Coastwise Slave-trade Act of 2 March 1807), and covered by the United States flag on the high seas. This was Calhoun's exact theory. The English government refused, but a new extradition treaty was agreed on (9 Aug. 1842). In the House, 21 March 1842, Joshua R. Giddings (q.v.) presented a set of resolutions which formulated the position of the political anti-slavery party to the end. They were, that the States have exclusive jurisdiction over slavery in their own territory; that the Federal government has exclusive jurisdiction over the high seas; that slavery, as an abridgement of the natural rights of man, can exist only by edict of a municipality and within its power of enforcement (this was Judge Curtis's argument in the Dred Scott case); that a vessel on the high seas has passed from municipal to national jurisdiction, so that Virginia law ceased to apply to the *Creole* when it left Virginia territory; that the negroes in resuming their natural rights violated no Federal law, and *ex hypothesi* no State law; and that attempts to re-enslave them were violations of the Constitution and laws, the rights of the free States and national honor. The resolutions roused a storm. John Minor Botts (q.v.) of Virginia moved a counter resolution that no good citizen, and especially no national representative, should provoke contention over a question on which diplomatic negotiations were pending, and which might plunge the whole civilized world into war; and that Giddings' resolutions justified mutiny and murder. He asked a suspension of the rules to give it precedence of Giddings'. Giddings' colleague adopted it and moved the previous question; and after a two days' wrangle on points of order the resolution was passed without debate, 125 to 69. Giddings at once resigned; his constituency immediately re-elected him by an overwhelming majority, and instructed him to push his resolutions to a vote. As this would «put the Democratic party in a hole,» in current slang — the first two clauses being their pet tenets, and the others only obvious inferences from them — they evaded it by abolishing «resolution day» for the rest of the session, devoting the day to other business when it came around. His resolutions expressed the basis of one phase of the constitutional anti-slavery agitation. Consult Giddings, ‘History of the Rebellion’ (New York 1864). The statute of 1807 regulating the coastwise slave trade is in 2 U. S. Statutes at Large, 426.

CREOLE STATE, Louisiana, where the direct descendants of the original French and Spanish colonists form an important element in the social fabric.

CREOLIN, a mixture of cresols and creosols and other allied substances derived from the destructive distillation of wood, once used very widely in watery emulsion as antiseptics.

CREON, krē'ōn, in Greek legend, the son of Menœceus and brother of Jocasta. After the death of her husband, Laius, Creon seized the crown of Thebes and offered Jocasta and the kingdom to anyone who should free the city from the sphinx. This Œdipus succeeded in doing, unconsciously becoming the husband of his own mother. In the legend of the war against Thebes, Creon, the king, is said to have forbidden any one to bury the bodies of Eteocles and Polynices the sons and successors of Œdipus, and their sister, Antigone, was condemned to death for disobeying this order. Creon's son, Hæmon, the betrothed of Antigone, killed himself on her body. The story is told in the plays of Sophocles (q.v.), 'Œdipus Rex'; 'Œdipus at Colonnus' and 'Antigone.'

CREOSOTE (Greek «meat-preserver»), a product of the destructive distillation of wood or coal especially the former. Wood-tar creosote, when freshly prepared, is an oily, transparent liquid, colorless, and of indefinite composition, containing many different chemical substances, chiefly belonging to the aromatic series. It was discovered by Reichenbach in 1832, and for a considerable time was confused with carbolic acid. It has a strong, smoky smell, burns with a sooty flame and refracts light powerfully. It has been greatly used as an antiseptic, both in dentistry and general surgery, and also for the preservation of meat, from which circumstance it derives its name. Its preservative action is so marked that meat will not decay after it has been treated superficially with a 1 per cent solution. Coal-tar creosote is obtained in the distillation of coal-tar, and is usually understood to include that portion of the distillate which comes over at temperatures between 400° and 760° F., although different temperature limits are used by different distillers. Coal-tar creosote (technically known as «creosote oil») is used for the preservation of timber. For this purpose the timber to be treated is placed in an air-tight cylindrical iron tank, from which the air is exhausted by means of an air-pump. The creosote is then introduced at a temperature slightly higher than 212° F., and the temperature and vacuum are both maintained until the moisture of the wood has been entirely vaporized, and the wood itself impregnated with the oil.

Creosote is also used for fuel, for softening pitch and as an antiseptic application for the treatment of certain diseases of cattle and sheep. It is but slightly soluble in water, though it mixes readily with alcohol, ether and many other organic fluids.

For medical purposes «creosote is a mixture of phenols, chiefly guaiacol and creosol, obtained during the distillation of wood tar, preferably of that from the beech.» In its physiological action, being a mixture of phenols, it naturally resembles carbolic acid very closely. It is now widely used as a stimulant to digestion and as a tonic in tuberculosis and other wasting diseases. The vapor is of service when inhaled, in diminishing the mixed infections that occur in many cases of tuberculosis. Creosote is not specific for this disease. It is very widely employed in bronchitis and is of service in nausea and as an intestinal antiseptic. Poisoning by creosote resembles that of carbolic acid (q.v.).

CRERAR, John, American philanthropist: b. New York 1827; d. Chicago, 19 Oct. 1889. He entered mercantile life and accumulated a fortune, removing to Chicago in 1862, and adding to his wealth by railway financiering. He readily bestowed large sums upon charitable undertakings, and in his will left $2,500,000 to found the John Crerar Public Library, from which sensational novels and skeptical works should be excluded; $100,000 for a statue of Abraham Lincoln; and $1,000,000 to charitable and religious organizations.

CRERAR, Thomas Alexander, Canadian statesman: b. Molesworth, Ontario, 17 Oct. 1876. While a boy his parents settled at Russell, Manitoba, as homesteaders. He was educated at Portage la Prairie, helped on his father's farm till he was 19, then taught school for five years; later attended Manitoba College; and farmed for several years. He entered public life as a member of the Russell council. He is not a politician; but he showed remarkable business ability in organizing the Grain-Growers' Grain Company (now the United Grain Growers, Ltd.), formed to give farmers better selling facilities on the Winnipeg exchange, and of which he is chairman. In October 1917 he joined, as one of the Western Liberal representatives, the Union ministry of Sir Robert Borden, and was given the portfolio of agriculture.

CRESAP, Michael, American trader and Indian fighter: b. Allegheny County, Md., 29 June 1742; d. New York, N. Y., 18 Oct. 1775. His father, Thomas, emigrated from Yorkshire, England, settled in western Maryland, and was a member of the Ohio company in 1752. His son married a Miss Whitehead, of Philadelphia, while yet a minor, became a merchant, removed to the Ohio in the spring of 1774, and established a settlement below Wheeling. He took command of the pioneers, who prepared for an Indian war, and, after Dr. Connolly had warned him of a general Indian war, made a declaration of hostilities on 26 April and defeated a party of Indians in a skirmish on the river. Another party of whites treacherously massacred the family of the chief Logan on Yellow Creek. Logan, who had been friendly to the English, accused Cresap, as the leader of the white men in that region, of committing the crime, and through a pathetic speech, attributed to Logan and preserved in Jefferson's 'Notes,' the deed attached to his memory, until his son-in-law, J. J. Jacob, and later Brantz Mayer, proved that he was in Maryland at the time of the occurrence. Governor Dunmore gave him the commission of captain of the Hampshire County militia in Virginia. After the conclusion of the Dunmore expedition he returned to Maryland, but again went to Ohio the following spring, and penetrated almost to the Kentucky wilderness. On his return he learned that he had been commissioned by the Continental Congress as captain of a company of Maryland riflemen. He went with his company to Boston and joined the army of Washington, but, having been afflicted with his final illness before he took the command, and finding himself growing worse, he left for home, and died on the way, in New York, where he was buried with military honors in Trinity churchyard. Consult Jacob, J. J., 'Biographical Sketch of Captain

M. Cresap' (1826; new ed., with notes, by Brantz Mayer, Cincinnati 1866), and Mayer, Brantz, 'Tagah-jute, or Logan the Indian and Captain Cresap' (New York 1867).

CRESCENDO, or **CRES** (Italian), a musical term signifying that the notes of the passage over which it is placed are to be performed with constantly increasing volume of tone. The ancient Romans, as we learn from a passage in Cicero, were aware of its beauty, and practised it continually. Crescendo passages are frequently marked < signifying piano to forte and fortissimo; the corresponding mark > diminuendo, marking the transition from forte to piano.

CRESCENT (Lat. *crescens*, growing), an emblem representing the moon in her state of increase. The Egyptians and the Greeks decorated their moon-goddesses, Isis and Selene, with the crescent, which announced the returning light of the moon. Athenian citizens of illustrious birth wore crescents of ivory and silver upon their buskins; and the same mark of distinction was granted to the patricians and senators of Rome. It was used by the Romans as an emblem of the eternity of empire. Hence it was found on medals of many cities, particularly of Byzantium, as capital of the Eastern Empire, whence it is supposed to have been borrowed by the Ottomans. Since their establishment in Europe it has been the universal emblem of their empire. It is frequently seen on churches in Russia, generally surmounted by the cross, indicating the Byzantine origin of the Russian Church. During the Crusades, particularly, the crescent was the distinguishing symbol of the Mussulmans, as the cross was representative of the Christians. The word is also applied to a Turkish musical instrument introduced into the German military bands at the time of the Turkish wars and now in general use in military bands. It consists of a staff surmounted by a cap and supporting several crescent-shaped brass plates on each of which little bells are hung. The instrument is played by being jingled in time to the music. In heraldry, the crescent is used both as a bearing or charge; and as a difference or mark of cadency. In the latter cases, it designates the second son and those that descend from him.

CRESCENT CITY, a name by which New Orleans is widely known because the older portion is built around a semi-circular bend of the Mississippi. Now the city has spread around another bend farther up stream, and is nearly S-shaped.

CRESCENTIA. See CALABASH-TREE.

CRESCENTINI, krĕsh-ĕn-tē'nē, **Girolamo,** Italian singer: b. Urbino, 2 Feb. 1766; d. Naples, 24 April 1846. He was styled the Italian Orpheus, because of his exquisite mezzo-soprano. After studying with Gibelli at Bologna, he made his début at Rome in 1783, and then toured through the principal cities of France, England and Italy. Napoleon awarded him the Iron Crown in 1805, and was his patron (1806–12). Leaving Paris in 1816, he became a professor of voice culture at Naples. His treatise on vocalization was published in both French and Italian.

CRESCENTIUS, krē-sĕn'shĭ-ŭs, **John,** Roman patriot; d. 998 A.D. He was a leader of the party in Rome opposed to the rule of the emperor in the 10th century. From 985 to 996 his rule in Rome was practically undisputed, and he was recognized as Patricius by the Byzantine empress. In 996 Otto III came to Rome, and overthrew the rule of Crescentius temporarily, but the latter resumed his position when the emperor left the city, drove the Pope, Gregory V, from Rome, and supported the anti-Pope, John XVI. Otto, however, finally defeated Crescentius in 998 and had him beheaded. Consult Gregorovius, 'Rome in the Middle Ages' (Vol. III, London 1895).

CRESCENZI, krĕsh-ĕnt'sē, **PIETRO,** or **PETRUS DE CRESCENTIIS,** Italian writer on agriculture: b. Bologna 1230; d. 1307. At the age of 70 he was made senator, and he now carried into execution his principles of agriculture on an estate near Bologna, in the cultivation of which he passed the remainder of his life. He has left a work on agriculture entitled 'Opus Ruralium Commodorum,' a remarkable monument of his time, of which it is far in advance. This work was written originally in Latin. There exists an Italian translation (1478), esteemed very highly on account of the purity of the language, which has given rise to the opinion that Crescenzi wrote in his native tongue. His principles are simple, founded upon experience and free from many prejudices which continued to prevail in Europe for centuries after. His work was translated into several European languages, particularly for Charles V of France, in a splendid manuscript (1373), still extant; and no sooner was the art of printing invented than copies of this work were greatly multiplied. The oldest known edition, now very rare, appeared at Augsburg in 1471. The genus *Crescentia* was named by Linnæus in honor of the famous author, who was probably the first since the days of the Romans to point out the high value of agricultural science.

CRESCIMBENI, krĕsh-ĭm-bā'nē, **Giovanni Maria,** Italian scholar and poet: b. Macerata, 9 Oct. 1663; d. 8 March 1728. In the Jesuits' college at Macerata he wrote at 13 a tragedy—'Daris.' He was one of the 14 poets associated with Christine of Sweden in founding the Academy of Arcadia, of which he was the first president (1690). In 1698 appeared his 'Istoria della volgar Poesia,' a work of vast industry, but destitute of method and criticism. He next published his 'Trattato della Bellezza della volgar Poesia' (1700), which passed in a short time through three editions, and like the earlier work was first made capable of being understood and enjoyed by the 'Commentario intorno alla Storia della volgar Poesia' (1702).

CRESCO, Iowa, the county-seat of Howard County, situated in the northeastern part of the State, about 150 miles northeast of Des Moines, on the Chicago, Milwaukee and Saint Paul Railroad. It maintains a hospital, has extensive dairying and live-stock interests, and manufactures machinery, cupolas, telephone condensers, electrical supplies, steel corn cribs, lightning rods, furniture, stump pullers, tow, flour, brick and tile. A "Farmers' Alliance" store is successfully operated here. The town is governed by a mayor and council and owns its waterworks. Pop. 2,658.

CRESOL, krē'sōl, an aromatic compound having the formula $C_6H_4(CH_3)OH$, which may be regarded as derived from phenol by the substitution of methyl (CH_3) for one of the hydrogen atoms in the benzene nucleus. Like all di-substitution benzene compounds, cresol exists in three isomeric modifications, known respectively as orthocresol, metacresol and paracresol. (See Aromatic Compounds). All three occur in coal-tar, though the ortho- and para-compounds are present in much larger quantity than the meta-compounds. The ortho- and meta-compounds readily yield nitroso-derivatives, and are used in the manufacture of coal-tar colors. Orthocresol melts at 90°, and boils at 370°; metacresol is liquid at ordinary temperatures and boils at 394°; and paracresol melts at 99° and boils at 392°; all these temperatures being on the Fahrenheit scale.

CRESPI, Giuseppe Maria, Italian painter, surnamed Lo Spagnuolo: b. Bologna 1665; d. there, 16 July 1747. His first work was the 'Combat of Hercules with Antæus.' From this time he had continual employment. He painted for Cardinal Ottoboni the 'Seven Sacraments,' now in the Dresden gallery; several pieces for Prince Eugene of Savoy, for the Elector of the Palatinate, for the Grand Duke of Tuscany, and for Cardinal Lambertini, his patron, who afterward, when Pope Benedict XIV, conferred on him the honor of knighthood.

CRESS, various plants of the family *Brassicaceæ*. The cultivated ones are all used as salads, for which their pungent foliage especially recommends them. The common or garden cress or peppergrass (*Lepidium sativum*) is generally found in gardens as a spring annual. The seeds may be sown as soon as the soil can be worked and the fresh herbage cut for use in about three weeks. Successive sowings should be made every three or four days. The plant resembles watercress in flavor, and makes an excellent garnish. Virginia cress (*L. virginicum*) is a similar species and has been grown and used like the preceding. Winter or upland cress (*Barbarea barbarea*) is an annual, common in fields in Europe and America and sometimes cultivated for winter use, as is also its close relative (*B. verna*) which is called early winter or American cress. Watercress (*Radicula nasturtium-aquaticum*) is a perennial aquatic herb common in cool brooks and yielding an important winter salad where the streams do not freeze. Though it does best in gravelly bottomed shallow streams, it may be cultivated in any moist ground, or under greenhouse benches if well supplied with water. Indian cress, which is a species of *Tropæolum*, is commonly known as nasturtium, a popular garden flower whose foliage, flower buds and blossoms are used as salads, and its immature fruits as a substitute for capers. Several other species of *Brassicaceæ* are called cress in various parts of the world.

CRESSET, (1) a bowl-shaped article made of incombustible material, used to contain a light, and hung from above or suspended on a pole or placed as beacon on a watch tower or on some prominent place. The cresset-light was formerly the flame from a coil of pitched rope, and in more modern times oil and wick were used. The large lanthorn of ancient days when suspended from the end of a long pole and carried on a man's shoulder was called a cresset. A stone containing bowl-shaped hollows which are sometimes used as cressets is called a cresset-stone. (2) An iron frame used by coopers who make barrels by hand.

CRESSEY, George Croswell, American clergyman: b. Buxton, Me., 1 April 1856. He was graduated at Bowdoin College in 1875 and received the degree of M.A. from this institution in 1878. He studied for a time at Leipzig, receiving there the degree of Ph.D. in 1880. He was graduated at Andover Theological Seminary in 1884 and entered the Unitarian ministry; held pastorates at Bangor, Me., Salem, Mass., Northampton, Mass., and Portland, Ore. In 1907 he was called to the pastorate of the Effra Reformed Church, London, England, in which relation he remained until 1913, when he returned to America and became minister of the Church of the Redeemer, New Brighton, N. Y. He is author of 'The Essential Man' (1895); 'Mental Evolution' (1894); 'Philosophy of Religion' (1892); 'The Doctrine of Immortality in Liberal Thought' (1897); 'Soul-Power' (1899); 'Outline of Unitarian Belief' (1905); 'A Talk with Young People on Liberal Religious Thought' (1912).

CRESSIDA, in Greek legend a daughter of Calchas, the Trojan priest. She is also known as Briseis, and her fame rests upon the legend of her amour with Troilus. The original story of Troilus and Cressida was ascribed to Lollius, a historiographer of Urbino. It was written in Latin and translated by Chaucer. Cressida was faithless to Troilus and became mistress to Diomede.

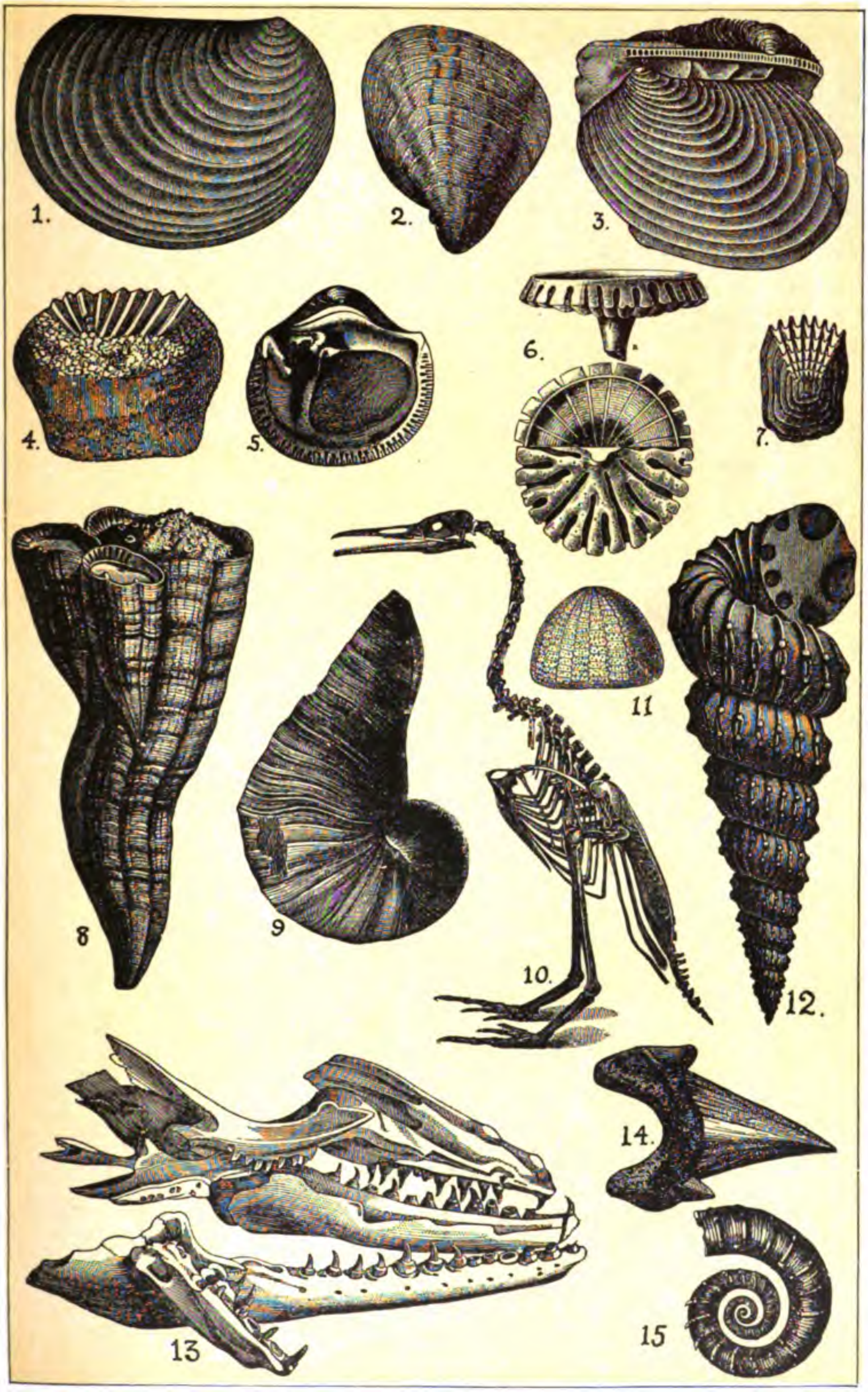
CRESSOL. See Cresol.

CRESSON, Elliott, American philanthropist: b. 2 March 1796; d. 20 Feb. 1854. He was a successful merchant in Philadelphia, where he resided all his life, and a member of the Society of Friends. He engaged in establishing the first African colony of liberated slaves in the territory of Bassa Cove, and was agent of the National Colonization Society. He everywhere recommended his measures with the eloquence of sincere conviction, and met with much favor and success. He sailed to England in 1840, where he spent some years in advocating the project of colonization. His time and labor were contributed without pay, and by his will he distributed his estate to a great variety of charities, mostly to institutions already established, but a bequest of a landed estate of over $30,000 was to establish a home for aged, infirm or invalid merchants or gentlemen, unable to procure the comforts appropriate to their condition in life.

CRESSON, Pa., village in Cambria County, situated among the Alleghany Mountains at an elevation of 3,000 feet and 75 miles east of Pittsburgh, on the Pennsylvania Railroad. Its fine scenery and the magnesia springs in the vicinity make it a popular summer resort. It has an academy and hotel, lumber, coal and coke yards, and a brewery. Pop. of township 1,470.

CREST (Lat. *crista*, tuft or comb), the rising on the defensive armor of the head, also the ornament frequently affixed to the helmet, such as a plume or tuft of feathers, a bunch of horse-hair, etc. Warriors have always been in the habit of adorning their persons; and the helmet, from its conspicuousness, is very naturally chosen as the place of one of the principal

CRETACEOUS FORMATIONS



1 Inoceramus concentricus
2 Exogyra columba
3 Inoceramus Cripsi. The hinge, showing ligamentary pits
4 Ptychodus latissimus
5 Caprina adversa. The lesser shell: interior
6 Coeloptychium incisum. From the side, from above, and from below
7 Scale of Ktenoid
8 Hippurites Toucasianus
9 Caprina adversa
10 Hesperornis regalis
11 Ananchytes ovata
12 Turrilites catenatus
13 Head of Mosasaurus Hofmanni
14 Tooth
15 Crioceras Duvali

ornaments. The crests of the earlier Greeks were of horse-hair; afterward plumes, especially red ones, were adopted. In the Middle Ages, when rank and honors became hereditary, and particular heraldic devices were appropriated to particular families, the crest became a distinguishing hereditary mark of honor. It denotes in heraldry a figure placed upon a wreath, coronet or cap of maintenance, above both helmet and shield; as for instance, the crest of a bishop is the mitre. The crest is considered a greater criterion of nobility than the armor generally. It is commonly a piece of the arms, rests on a wreath of the principal metal and color of the coat of arms, color and metal alternating, or on a cap of maintenance. Consult Fairbairn, 'Book of Crests of the Families of Great Britain and Ireland' (Edinburgh 1892).

CRESTING, *in architecture,* is an ornamental finishing in stone, tiles or metal in the wall or ridge of a building, such as the cresting at Exeter Cathedral, where the ridge is ornamented with a small range of leaden fleurs-de-lis.

CRESTON, Iowa, city and county-seat of Union County, about 200 miles west of Burlington, on the Chicago, Burlington and Quincy Railroad. It was first settled in 1869; became a borough in 1871, and a city in 1881. The present form of government is by State enactment under a charter of 1870, revised in 1890, which provides for a mayor, chosen biennially, and a council of 10 members. Five aldermen are elected each spring. The city has three banks, with a combined capital of $250,000; 15 churches, public and parish schools, a government building, costing $100,000, and a railroad depot, costing $75,000. It is a trade centre for the surrounding country and has machine shops, brickyards, broom and cigar factories, wagon works, planing mills and a cold storage plant. Pop. 6,924.

CRESWICK, Thomas, English landscape painter: b. Sheffield, 5 Feb. 1811; d. Bayswater, 28 Dec. 1869. He studied drawing at Birmingham under John Vincent Barber and early showed artistic talent. His first pictures were admitted into the Academy exhibition when he was only in his 17th year, and his success was afterward continuous. He was elected an associate of the Royal Academy in 1842 and R.A. in 1851. Among his works are 'England'; 'London Road a Hundred Years Ago'; 'The Weald of Kent'; 'A Roughish Road'; 'On the Clyde'; 'Sunshine and Showers.' Creswick's landscapes are pleasing and attractive, and display much delicate and finished detail. He was also known as an etcher. His works were collected for the London International Exhibition of 1873, and a catalogue compiled by T. O. Barlow, R.A. Consult Ruskin, 'Modern Painters'; Hammerton, 'Etching and Etchers.'

CRETACEOUS, a name applied by geologists to the latest period of the Mesozoic Era, and to the system of rocks then formed. It follows the Jurassic and precedes the Tertiary. The name comes from the Latin for chalk and in the type localities the formation is usually characterized by white, soft chalk, but sometimes, more especially in Italy and the south of France, this chalk is replaced by compact, solid limestones. In England and France the Cretaceous rocks consist chiefly of carbonate of lime, but usually abound with silica, in the shape of nodules, plates and veins, and with iron pyrites in nodules and radiated cylinders. The organic remains in the chalk are, with few exceptions, eminently marine, and from the fine texture of the substance in which they have been embedded are usually well preserved. They embrace seaweeds, sponges, corals, echinoderms, mollusks, crustacea, fishes and reptiles. Deep-sea dredgings in the Atlantic have revealed the fact that a fine, white, organic ooze, resembling the chalk, is still in process of formation in the oceanic abysses at the present day. In America, the system is divided into Lower or Comanchean, and Upper or Cretaceous. Some writers give Comanchean the rank of a period, making it co-ordinate with Jurassic, and restrict the term Cretaceous to the Upper Cretaceous as above defined. During Lower Cretaceous the continent of North America was not very different in outline from now, except that the Gulf of Mexico was expanded, and that the Pacific still covered the site of much of the present Coast Ranges. During Upper Cretaceous time, a great arm of the sea encroached on the land, finally extending from the Gulf of Mexico to the Arctic. In this a great thickness of marine sediments was laid down. At the same time much of the Atlantic and Gulf Coastal Plain was under water. Toward the close of the period (Laramie Epoch) the interior sea again retreated leaving a large area of low swamp, in which much coal was formed. The period, and the Mesozoic Era as well, were brought to a close by folding which produced the Rocky Mountains. The Andes were probably folded at the same time.

Life of the Cretaceous.— The great groups of reptiles which developed during Triassic and Jurassic (q.v.) reached their climax in Cretaceous, and Dinosaurs, Pterosaurs, Mososaurs, Ichthyosaurs and Plesiosaurs all became extinct at the close. The Ammonite Cephalopods also died out completely. The most notable addition was the development of the modern types of flowering plants, which became dominant before the close of the period.

CRETE, or **CANDIA** (called in the most ancient times Idæa, from Mount Ida, afterward Creta, whence the Turkish name Kirid), one of the most important islands of the kingdom of Greece; situated in the Mediterranean, 81 miles from the southern extremity of the Morea, and 230 from the African coast; is 160 miles long, 7 to 35 broad, and contains 3,326 square miles. A high chain of mountains covered with forests runs through the whole length of the island, in two ranges. On the northern side it declines moderately to a fertile coast, provided with good harbors; on the south side, steeply to a rocky shore, with few roadsteads, and reaches its greatest height in the lofty Psiloriti (the ancient Ida), 8,060 feet high, and always covered with snow. Numerous springs give fertility to most of the valleys, in which, and on the declivities of the mountains, is seen a luxurious vegetation. The air is mild; the summer is cooled by the north winds; the winter is distinguished only by showers of rain. Earthquakes, however, are not infrequent. Agriculture is at a very low stage, and education and the amenities of civilized life are almost entirely absent. The principal products of the island are olive oil, wheat, oranges, lemons, silk, grapes, wine, valonia, carobs and honey. The inhabitants (estimated at 1,200,000 in ancient times, or 900,000 in the time of the Venetians) are now 344,000, of whom about a third are Mohammedans. Soap is extensively manufactured, and the exports comprise olive oil, soap, wool, carobs, cheese, fruits, valonia, acorns, etc. Most of the harbors are silted up. The capital is Candia or Megalokastron; Canea is the most important place of trade.

Greek mythology made Crete the scene of many of the adventures of the gods and heroes. Here Saturn is said to have reigned and afterward Minos.

Archæological exploration and excavation in modern times have revealed that a Neolithic period of evolution from about 10,000 to 3315 B.C. was followed by the Minoan or Ægean period of civilization, which existed contemporaneously with the first dynasty of Egypt, from 3315 to 1450 B.C., and reached its culminating point in Crete. Minoan towns and palaces have been uncovered in different parts of the island, which recall the skill attributed to Dædalus (q.v.). They exhibit architecture and engineering of a high order, unsurpassed for domestic conveniences in modern times. At Cnossus in the ruined palace of Minos (q.v., whence Minoan), the thalassocratic king of the eastern Mediterranean, in the Hagia Triada and its shrine near Phæstus, in the palace at Phæstus, in the uncovered ruined towns at Palaikastro, Gourni and Zakro, in the shrine and Dictæan cavern, the legendary birthplace of the Cretan Zeus, near Psychro, and in the ruins on the neighboring islets of Pseira and Mochlos, the finds include archives of clay tablets in great quantities inscribed with the early forms of Minoan pictographic and linear script, polychrome decorated pottery, lifelike ivory and clay figures, mural paintings revealing the customs of the period, enormous decorated storehouse jars, stone and bronze votive figures and objects of cult, sarcophagi, etc. While at Cnossus, also, have been unearthed the foundations of what are acknowledged to be the traditional labyrinthine prison of the Minotaur (q.v.) or bull of Minos, the incestuous monster for whose gratification Athens was compelled to send an annual tribute of seven noble maidens and seven boys until Theseus (q.v.) killed the beast, probably during an invasion of the island which consummated the catastrophe that overwhelmed this early Cretan culture.

The island figures little in Greek history, and took no part in the wars with the Persians. It possessed a number of independent towns often at war with each other, but ready to combine against a stranger. Crete was conquered by the Romans 67 B.C. In the year 823 it passed from the Roman emperors of the East to the Saracens, who built the capital, Candia, on the ruins of Heraclea, but were expelled again in 961 by the Greeks. The Byzantine sovereign sold the island to the Venetians in 1204, who fortified most of the cities, won the good will of their new subjects by a mild government, and repelled all the assaults of the Genoese and Turks till the middle of the 17th century. About this time the attacks of the Turks became more determined. They landed a large force in 1645, which soon took Canea and Retimo, and besieged the capital with vigor. The siege, the longest in modern history, lasted over 20 years: To assist the Venetians volunteers from all parts of Europe poured in. The Christians, after having exhausted all means of defense, were compelled to surrender to the Turks 27 Sept. 1669. At the time of the capitulation the garrison consisted of only 2,500 soldiers; 30,985 Christians and 118,754 Turks were killed or wounded during the siege. Having obtained possession of the capital, the Turks now endeavored to expel the Venetians from the strongholds which remained to them on the island, and before the expiration of the 17th century they had been successful in their efforts.

Three pashas, at Candia, Canea and Retimo, now governed the island. On account of the feuds of these pashas the inhabitants of the western mountains succeeded in forming a government of their own, under Turkish protection. As the compacts made with them by the Turks were not always observed, they were wont in such cases to take up arms, and though they were often defeated they were never entirely subdued. The pashas having demanded hostages of them in 1821, they joined the Greek insurgents.

Had the mountaineers been armed when the Turks made their first descent on the island, it would probably have been impossible for the invaders to have maintained themselves in Candia, but as it was the island remained under Turkish rule. In 1868 a formidable insurrection, fomented by Greece, was with difficulty suppressed by the Turks, after a tedious conflict. In consequence of this revolt the Turks granted to the Cretans a certain degree of autonomy, but Turkish bad faith produced another revolt nine years later. At that time a new constitution of a parliamentary character was inaugurated, but many of its provisions were annulled in 1889. In 1896 there was again a rising against the Turks, in which, as before, the Greeks took part, one result being the outbreak of war between Greece and Turkey. The Greek troops landed on the island were withdrawn at the instance of the Great Powers, who undertook to secure an autonomous government under Turkish suzerainty and to cause the Turkish troops to be withdrawn. On 6 Sept. 1898 the Mohammedans of Candia rose against the Christians, and the fighting resulted in the death of many of the latter, including some British sailors. The leading powers at once demanded the complete withdrawal of the Turkish troops who had abetted the rebels, and ultimately, on 11 October, the Sultan complied with their demand, the troops being soon after withdrawn. Shortly afterward Prince George of Greece was appointed high commissioner or governor of the island. A national assembly met and formed a constitution providing for the creation of a legislature and guaranteeing freedom of religion to all inhabitants. Although order was restored, popular sentiment continued to be increasingly in favor of annexation to Greece, and in 1904 the High Commissioner attempted to gain the consent of the Powers to such a step but without success. There were revolts against the high commissioner's arbitrary policy in 1904 and 1905; in the latter year a revolutionary assembly proclaimed the union of the island with Greece, and this was followed by a similar proclamation on the part of the regular Chamber. The Powers intervened, and after some desultory fighting the insurgents laid down their arms in November 1905. In 1906 Prince George resigned the high commissionership of Crete and returned to Athens, but the designation of his successor was accorded by the protecting powers to King George of Greece as a satisfaction to Greek national sentiment. This arrangement lasted six years, but by no means satisfied any of the parties directly interested. The overwhelming majority of Greeks in the Cretan Assembly persisted in treating their island as an integral part of the Greek kingdom, while the government at Athens, out of deference to the four protecting Powers, was obliged to respect Crete as a shadowy vassal of Turkey. The six years were marked by almost constant political unrest on the island. A renewed proclamation of union with Greece in 1908, the exclusion of Mohammedan deputies who refused to take an oath of allegiance to King George in 1910 and the election of delegates to represent Crete in the National Assembly which revised the constitution of the Greek kingdom in 1912 provoked in each case repeated intervention of the Powers. It was a Cretan leader, Eleutherios Venizelos, who in 1910 became Premier of Greece and organized the Balkan League that prepared to wage war against Turkey. A popular uprising in March 1912 put an end to the government that had been forced upon the island by the protecting Powers, and erected in its stead a provisional government, the reception of whose delegates at Athens in October 1912 was one of the excuses for the outbreak of the Balkan War. In that war the Cretans fought shoulder to shoulder with their fellow Greeks of the Greek kingdom, and by the Treaty of London (31 May 1913) Turkey renounced all sovereignty over the island. The union of Crete with Greece was formally recognized by the other Balkan states by the Treaty of Bucharest (10 Aug. 1913). Consult Höck, 'Creta' (1823–29); Pashley, 'Travels in Crete' (Cambridge 1837); Spratt, 'Travels and Researches in Crete' (London 1865); Stillman, 'The Cretan Insurrection of 1866–68' (New York 1874); Mitchell, 'The Greek, the Cretan, and the Turk' (London 1897); Freese, 'Short Popular History of Crete' (ib. 1897); Howes, 'Crete the Forerunner of Greece' (ib. 1907); Nevor-Batteje, 'Camping in Crete' (ib. 1914).

CRETE, Neb., city in Saline County in the southeastern part of the State, 20 miles southwest of Lincoln, on the Chicago, Burlington and Quincy and the Missouri Pacific railroads, and on the Big Blue River. It is the seat of Doane College (Congregational), established in 1872, which has a well-equipped observatory. It has a public library and several industries, including flour mills, a creamery and a voting-booth factory. Settled in 1867, Crete was incorporated as a village in 1871 and is at present governed under a revised charter of 1886. The council consists of the mayor and representatives from the city wards. The city owns and operates its waterworks and electric-light plant. Pop. 2,404.

CRETIN, **krā-tăn'**, **Joseph**, American ecclesiastic. b. Lyons, France, 1800; d. 22 Feb. 1857. He was ordained a priest in 1838 and was assigned a charge in his own diocese. His great desire was to work in the foreign missions, and when the opportunity to go to America presented itself he at once accepted. He was somewhat disappointed when he found himself among civilized people in Iowa instead of among Indians. He was made vicar-general of Dubuque, a position which he held until 1851, when he was appointed bishop for the new diocese of Saint Paul. He found only nine priests in his diocese, but new parishes were soon opened, schools established, the orphans and the sick received attention and provisions were made for the Indian tribes, the Ojibways, the Winnebagoes. In three years he increased the number of churches from 1 to 29, and to these added 35 stations. Consult Clark, 'Lives of Deceased Bishops of the United States.'

CRETINISM. This is a broad general term applied to a combination of physical and mental changes which, in the young, result from loss or diminution of the thyroid functions. Such a loss may occur sporadically (*Sporadic cretinism*) from causes to be enumerated, where the picture is analogous to that seen in the adult from removal of the thyroid, *cachexia thyreopriva adultorum*; or in many occur as a localized or *endemic* degeneration affecting the thyroids of a large number of individuals, causing a hypothyreosis which may show a number of tendencies. The chief of these are *goitre, goitrous heart* and *endemic cretinism*.

These four fairly well-separated conditions may be discussed to advantage under the head of cretinism. The historical chapters on cretinism are full of interest. The disorders were known in early days. Pliny has left indubitable evidence of their presence in early Roman times. Vogt in his admirable monograph in the Lewandowsky, 'Handbuch der Neurologie' tells of Marco Polo's descriptions of certain types he had seen in his Asiatic travels. During the past two centuries the disorders here included under the term have been observed through the world. In certain lands, especially certain mountainous districts of Switzerland, northern Italy, etc., the disease is very widely distributed — endemic cretinism — while in other regions it occurs rarely — sporadic cases. In the United States it is not frequent. It has been observed in California, in Vermont, and the writer has seen such patients in New York State (Adirondacks). In certain regions it has been a veritable plague. Thus in Switzerland, between the years 1875–84, 7 per cent of the recruits in the army showed some form of cretinoid degeneration. In 10 years 2,500 men were lost to the Swiss army from this cause alone. Certain valleys, especially those of Berne and Wallis, are thickly populated with individuals showing cretinoid degeneration. In the school years 1899–1904, of 336,000 children fit for school 15,000 had one or another type of cretinism. Similar conditions existed in Styria, in Austria, and in certain Italian provinces.

So far as the etiology is concerned, it seems certain that the conditions are due to a defect of the thyroid substance — diminution or loss of the thyroid hormones. There are certain limitations which must be discussed in their respective paragraphs.

Sporadic Cretinism.— Infantile *Myxedema*. The clinical picture in an extreme case — i.e., fully developed, in contrast to the many irregular or incomplete forms — is that of a normally born child who, about the end of the first or the beginning of the second year, begins to show the characteristic changes in development. The little patients fall behind in their normal bony development. This is due to a defect in the development of the long bones. The epiphyses fail to lay down bone even after 20 to 35 years and in 20-year-old cretins the anterior fontanelle may still remain open. There is a proportionate loss in bone substance throughout; thus a characteristic dwarfism results save perhaps in the development of the skull which becomes larger in proportion to the rest of the body. The sphenoid, however, fails to develop and therefore gives the peculiar characteristic nose to the cretin. Dental deficiencies go hand in hand with the bony defect. In severe athyroid cretins the teeth do not develop for a number of years, and the first or milk teeth may persist far beyond the normal period. The bony defects show in a high palate arch, with large adenoids and tonsils, and a chronic hypertrophic rhinitis causes the child to snore and sniffle, often with copious excretions from the nose.

A fairly constant finding is that of umbilical hernia. The abdomen is usually puffy, the navel sunken. The skin is myxedematous in the young, but becomes atrophic in later years, the supraclavicular and facial swelling remaining for many years.

The facial habitus is characteristic. The hair line begins low, the nose is sunken, the zygomatic arches prominent, the eyelids swollen, the face puffy, the tongue enlarged and often protruding between the swollen lips, in the mild cases giving one the impression of a child whose whole countenance is puffed up with crying.

There is usually an enlargement of the liver. Respiration is unusually slow in the severe athyreoses. The genital organs show marked changes. The labia are small, the external not covering the internal ones. The uterus and ovaries are usually small, and the mammary glands are atrophic or hypoplastic. The penis is apt to be small, the testicles undescended, and small. Genital hair and that in the arm pits is absent or scanty. In boys the puberal changes in the voice are lacking.

Nervous system defects are present with the others and apparently conditioned by the endocrinous gland insufficiencies. These show at vital levels in the deficiencies of the sensory and motor nerves, and at psychical levels in various grades of stupidity, mental weakness (moron), imbecility, or even idiocy — these words being used according to the arbitrary scaling of the Binet-Simon tests.

Thus smell is at times defective. The eyesight is poor, hearing is frequently disturbed and with it speech, so that many patients are deaf and dumb. The vestibular function is frequently involved, so that these patients balance badly, often showing unsteady gait, wobbling of the head and nystagmus. Some sporadic cretins may show little disease of the nervous system.

Cretinoid Degeneration.— Mention has been made of the widespread character of this type of degeneration related to defective or absent thyroid secretions. The statistical study of the conditions, particularly in Switzerland, in France and in Italy (Bircher), has shown that goitre, goitrous heart, endemic cretinism, endemic deaf and dumbness and endemic feeblemindedness are closely allied. The cretins are almost all goitrous, or nearly always have goitrous parents. Exophthalmic goitre (hyperfunction) is rare with goitre, but very frequent with goitrous heart conditions. (See GOITRE). The causes of the hypothyroidism are not definitely settled, but there seems to be a constant relation between it and certain factors in certain waters, so that goitrous springs are known. Just what the noxious element may be is still conjectural, but it apparently is related to mineral constituents found in certain geological formations, notably in the Trias and Tertiary. The disease is absent in regions fed from waters of crystalline formation. Through Bircher's suggestion of supplying a goitrous region in Rupperwill from Jura water supplies, in an adjacent valley, the disease disappeared. Similar results followed in the town of Asp. Animals may be made goitrous from drinking water from certain springs. They also develop goitrous hearts and are delayed in their development. The thyroid shows degenerative changes. The agent passes through a Berkefeld filter, but is modified and made non-active by being heated to 70° C. It does not dialyze and is not thought to be an organized plant or animal substance, but is of a colloidal nature. An hypothesis which had the authority of Bircher behind it was that the disease was of an infectious nature.

Endemic Cretinism.— Here there is a richer and much more variable picture than obtains for sporadic cretinism. Whereas a typical habitus is described, there are many anomalies and variations. The head is usually broad (but may be small and flat, instead of large and broad), at times very large. The nose is usually wide spreading and flat, the eyes wide apart. The neck is short and thick, the features swollen, the facial expression, especially of the prognathism, is one of moroseness or stolidity. The bones are shortened, various anomalies as scoliosis, ankyloses, etc., being present. Great variation in dwarfism is observed. Certain cretins are under three feet six inches, but full cretins have been observed of seven feet in height. As a rule they die young, but Kocher reports cretins 70 and even 100 years of age.

The general co-ordination of these patients is poor. They are usually short, clumsy, unelastic with badly developed masculature. The skin is loose, lax, anæmic, marked with folds and wrinkles, giving a peculiar appearance of old age. The lips are swollen, the tongue is enlarged and not infrequently protruding. The breasts are flat or badly developed, the abdomen flat or pendulous. Short stumpy fingers and toes give an ugly appearance to the extremities and contribute to clumsiness. The entire activity is apt to be heavy and awkward, although a few athletes and acrobats may be found among cretins.

The changes in the bones have been mentioned in the paragraphs on sporadic cretinism. The skin has a peculiar cachexia. It is swollen and flabby, whitish or yellowish, folded and soggy. The general appearance of old age is striking. The hair and nails are badly developed, both breaking easily. Thick, underlying fatty masses are unevenly distributed, usually in the neck, back, upper chest regions, occasionally over the hands. Variable states of tension occur in these fatty masses; at times they are hard, again like empty sacks. The mucous membranes are also pale and gray, often folded but look different from a typical anæmia.

The sexual organ changes have been touched upon in the description of sporadic cretinism. They are characteristically infantile. Menstruation is scanty, wanting or develops very late. Fecundation may take place, but the results are either miscarriages, dead children, various monsters, etc. The secondary sexual characters are all delayed in their development.

The majority (63 per cent, Ewald) of cretins show a swollen thyroid, but it is not an over-functioning one, nor do they all show athyreosis or hypothyreosis.

Most of the internal organs show reduction in activity. Digestion is usually slow, constipation is marked. The metabolism is modified as already indicated. The urinary secretions are apt to be diminished and of high specific gravity.

Mentally cretins show marked variability. A few are practically normal, but most show a characteristic combination of mental traits, in contrast with many other mental defective states. The feeble-mindedness is accompanied by great slowness of all reactions, marked retardation of motion, apathy and indolence. This indolence is a marked feature. Many cretins will lie in the sun all day long, and in the hospital or other institutions will lie around and do nothing for weeks or months. In the milder grades there is often great shyness which makes them unapproachable and serves to make them appear more feeble-minded than they really are. It is with the greatest difficulty that they can be trained to the simplest of performances. With many, in spite of the marked general stolidity of their average mood, they may show great excitement and emotional outbreaks.

They are very negligent, love to sit still, but many show much variability in this respect. As noted the great majority suffer from impairment of the chief sensory tracts. Hearing seems to suffer most. The defect in hearing is associated with speech defects. Taste and smell are also involved. They take little interest in their food or drink and therefore show little interest in hunger, which is marked. The sense of sight is frequently diminished. It is highly probable that the receptors and conduction paths are less involved than the perception areas in this diminution in sensory intake. The hearing seems to be affected primarily as to its receptor and conduction paths. Pain, touch and thermal sensibilities are all dulled. Motility is extremely retarded. The reflexes are active (50 per cent). The field of vision is reduced in many, although the *fundus* is usually normal (Hitschmann).

Aberrant and abortive types are to be expected. In the former one may find patients with striking development of one or more features, in the latter a very great shading off to almost normal states, i.e., endemic goitre with mild mental signs.

Endemic Deafmutism.— This combination is extremely frequent where endemic cretinism is present (29 per cent, Scholz). It may constitute one of the aberrant types just mentioned with striking development of single features, or it may be associated with all the grades of a complete cretin picture. According to the studies of Kocher, the loss of hearing is due to a bony defect which has destroyed the possibility of normal cochlear development. Bad hearing is reported at 32 per cent among cretins in Scholz's investigations.

The changes found in the brain which may account for the feeble-mindedness have been variable. Meningeal inflammation and mild grades of hydrocephalus have been found by Scholz and Zingerle. The brain is often symmetrical, small or single lobes are diminished in size. Often the brain's development is arrested at an infantile stage, the pallium or the ganglia being involved alone or together. The cerebellum is often imperfectly developed, which fact stands in correlation with the marked inco-ordination and possibly in relation with defective labyrinthine development.

The ear difficulties have been protean. Peripheral, conducting and central mechanisms have been found at fault; at all events they all seem secondary to the developmental anomalies induced by the action of the poisonous substance on the thyroid. The speech defects usually go hand in hand with those of hearing, but this is not universal. The cortical developmental defect is sufficiently explanatory for most of the cases.

Therapy.— Many contradictions may be found in the literature concerning the use of thyroid substance in cretinoid degeneration. Among the best reported results are those of v. Wagner who obtained a diminution in the myxedematous swelling of the skin, rapid development of the genitals, diminution in size of the tongue, disappearance of the umbilical hernia, development of new hair, hastening of dentition, closure of the fontanelles, increase in bony development. The psyche was less hopefully modified, but there was a diminution in the apathy and slight increase in intellectual capacity.

Early therapy is naturally the main feature. According to v. Wagner, small doses of iodine in addition seemed to stimulate the thyroid activities still further. Magnus Levy, v. Eysselt and others also report excellent results, complete cure resulting in some patients still in their teens.

A widespread state experiment carried out by v. Kutscheras in Styria treated 1,011 cretins. A large number were neglected by the parents, i.e., treatment was not kept up. In 2.4 per cent the thyroid tablets could not be well borne. All idiots and severe grades of deafness and dumbness were left alone. Of 440 of the cases 10.2 per cent showed slight increase in bony development, 4 per cent showed definite change, 85 per cent showed an increase well above the average. The increase in bony growth was marked with the younger individuals, but also persisted into the third decade.

A careful revision of 677 cases showed 42.8 per cent marked improvement, 48 per cent some definite improvement, 8.6 per cent no improvement.

Iodothyrine has also been utilized. One gram contains three milligrammes of active substance representing the iodine content of one gram of fresh sheep's thyroid. It would seem that the iodine content is not the only factor in the activity of the thyroid substance and it is not as yet definitely demonstrated what the combination is that is effective. The result of the use of implanting of glandular substance would be the ideal therapy and experiments directed to this end have been attempted since 1889 when Bircher was one of the first to attempt it. The gland has been implanted in different portions of the body — the neck, under the breast, in the spleen, even in the bony substance. As a rule, however, the implantation has not been as successful as was hoped, the gland itself undergoing retrograde changes. Furthermore it would appear from the studies by Enderle and Borst that thyroids from other animals possibly are not the best things to use as the biochemical composition of the human and animal types varies so widely as to render degeneration of the implanted gland likely. Implantation of human glands has not been successfully brought about as yet, but with the newer work on organic transplantation as inaugurated through the researches of Carrel it would seem that this technical difficulty might be overcome in the very near future.

One is compelled, therefore, to resort in most cases to the dried or liquid preparations of the thyroid itself or to such biochemical products as laboratory research has provided through the utilization of the glandular substance itself or that portion of it which presents its chief hormone activity.

The general results of thyroid medication in typical cases is fairly constant. Especially is it of value in the aberrant and minor forms of the disease of which one of the most chronic of symptoms is the persistent anæmia. This may be in part overcome by the simultaneous use of small doses of arsenic, which have been recommended by a number of experimenters. Alcohol and morphine work disadvantageously and should be carefully avoided. The use of small doses of sodium bicarbonate and bismuth work advantageously in diarrhœal states.

Thyroid medication for the sporadic cases varies somewhat from its use in the endemic cases. In the sporadic cases of the light or mild type the action is quite similar to that seen in the endemic ones, but as a rule, sporadic cases by reason of their longer involvement and the less rapid development of the symptoms, the more hidden or obscure nature of the same, with their great mixture of syndromes, make such cases less responsive to the therapy. Nevertheless, many of them respond very kindly to it, the same dosage being utilized. Consult Bircher, F., ‘Pathogenese der kretinischen Degeneration’ (Berlin 1908); Haugardy and Langstein, ‘Jahrbuch für Kinderheilkunde’ (1908, 61); Falta, ‘Erkrankungen der Blutdrüse’ (1913); Jelliffe and White, ‘Diseases of the Nervous System’ (1917).

Smith Ely Jelliffe.

CRETONNE, krē-tŏn', a thick, firm cotton cloth with various textures of surface, printed on one side or on both with pictorial and other patterns, and used for curtains and for upholstering. Unlike chintz, it is hardly ever glazed. It takes its name from its manufacturer.

CREUSA, krē-ū'sạ, the name of several celebrated women of Greek antiquity. (1) Daughter of Erechtheus, who, before she was married to Xuthus, gave birth to Ion, the fruit of an amour with Apollo. To her second husband she bore Achæus. (2) The wife of Jason and the daughter of King Creon (q.v.) of Corinth. She was burned to death with her father by the magical poisoned diadem and robe given her as bridal gifts by Medea. Consult the ‘Medea’ of Euripides. (3) The daughter of Priam and Hecuba, wife of Æneas and mother of Ascanius. In the tumult of the conflagration of Troy, when Æneas fled with the images of his gods, with his father and son, he lost her, and after he had sought her for a long time in vain her spirit appeared to him, saying that the mother of the gods had taken her to herself because she was not willing that she should leave Phrygia. Consult Virgil, ‘Æneid’ (II, 730–794).

CREUSE, krēz, a department of central France; capital, Guéret; area, 2,164 square miles. It is named from the river Creuse, which rises in it and traverses it diagonally in a northwest direction. The surface is generally rugged and the soil is thin, rocky and by no means fertile. Coal is the only mineral worked. Many cattle, and notably fine cavalry horses, come from Creuse. The chief manufacturers are carpets and tapestry. Thousands of the inhabitants migrate to other parts of France in March each year in search of work and return about Christmas. The department is divided into four arrondissements. Pop. 266,188.

CREUSOT, krē-zō', **Le,** town in east-central France, in the department of Saone-et-Loire, 236 miles south of Paris. Situated in the midst of a district rich in coal and iron, it owes its importance to the establishment here in 1837 of the great iron works of Schneider & Company, which rank among the largest in the world. Steel rails, armor plate and ordnance, engineering material of all descriptions and electrical machinery are all produced by this firm, which in normal times employs 15,000 men.

CREUTZ, kroiz, **Gustaf Philipp,** Graf von, Swedish poet and statesman: b. Finland 1731; d. 30 Oct. 1785. He was a member of the learned and elegant circle which surrounded the queen of Sweden, Louisa Ulrica, sister of Frederick the Great. His ‘Atis og Camilla,’ an erotic poem in five cantos (1761), and his ‘Letter to Daphne’ are considered as masterpieces in Swedish poetry. He was appointed Minister to Madrid, and at a later period to Paris, where he remained 20 years and became particularly acquainted with Marmontel and Grétry. On 3 April 1783 he signed with Dr. Franklin a treaty of amity between the United States and Sweden. His works and those of his friend Gyllenborg are published together under the title ‘Vitterhets Arbeten of Creutz og Gyllenborg’ (1796).

CREUZER, kroit'sėr, **Georg Friedrich,** German philologist and archæologist: b. Marburg, 10 March 1771; d. Heidelberg, 16 Feb. 1858. He studied at Marburg and Jena, and in 1802 became professor of philology at Heidelberg. In 1807 the professorship of ancient history was also conferred on him, and he held both chairs till his resignation in 1845. His works treat of mythological subjects and classical history, the most important of them being ‘Die historische Kunst der Griechen’ (1803); ‘Dionysus’ (1808); ‘Symbolik und Mythologie der alten Völker, besonders der Griechen’ (1810–12); and an edition of Plotinus (1835). His symbolical theory of mythology gave rise to considerable controversy with Hermann, Voss and others. With G. H. Moser, he edited several of the works of Cicero. A collection of his writings was published in 1854 under the title 'Opuscula Selecta.' Consult Stark, 'Friedrich Creuzer, sein Bildungsgang und seine bleibende Bedeutung' (Heidelberg 1875); and Sandys, 'A History of Classical Scholarship' (Vol. III, Cambridge 1908).

CREVALLÉ. See Cavally.

CREVASSE, krĕ-văs', a breach in an embankment of any kind, made to protect lands from inundation, has from the earliest historical ages been of importance. How to guard against crevasses is a matter studied in all countries where their occurrence is a menace to public safety. Lands may be reclaimed from water by means other than embankments, dams, dykes or levees (see Drainage). The levees and dykes of all places are under a system of supervision for prevention of crevasses and other dangers. The levees along the Mississippi, begun in 1717, have been at various times and in certain places rendered ineffective by crevasses,— the water breaking through the levee in weak places where soil has become soft, or through holes made by the crawfish. The guards know the need of repairing at once any openings, however small, and the crawfish is regarded as an enemy. In 1882 the damages reported as caused by crevasses and floods were $27,000,000. Towns and farms were inundated and some lives were lost. In the years intervening between 1882 and 1892, damages reported amounted to $77,000,000; and in 1892, $7,000,000. When floods occur, as in 1897 and 1903, the dangers from crevasses increase. Two great crevasses occurred in 1903 during the floods. The damages amounted to millions. In addition to the danger of the water breaking through, there is that of self-protection, the people in the lower towns being tempted to let the waters above them escape from the channel. (See Floods; Levee). Cracks in glacial ice, due usually to unequal rate of motion, are known as crevasses. See Glacier.

CREVAUX, krā-vō, **Jules Nicolas,** French explorer: b. Lorquin, Lorraine, 1 April 1847; d. 24 April 1882. He took part in the Franco-Prussian War, and was later made a surgeon in the navy. In 1876 he turned his attention to the exploration of South America; he first crossed the Tumachumac Mountains; then explored the valley of the Oyapok and its tributaries and several tributaries of the Amazon. In 1880 he crossed the cordilleras of the Andes and reached the Orinoco by the Guaviare River, a tributary never before explored. He returned to France for a short time, but in 1882 started on another expedition, intending to explore the upper part of Paraguay and some of the southern tributaries of the Amazon; when he arrived at Buenos Aires he became interested in a plan for the exploration of the Gran Chaco and the Pilcomayo River, and joined an expedition for that purpose. He and all but two of his companions were murdered by the Tobas Indians on the banks of the Pilcomayo. An account of his explorations was published under the title 'Voyages dans l'Amérique du Sud' (1883). A work published by the Geographical Society of Paris and entitled 'Fleuves de l'Amérique du Sud' (1883) is based on his researches.

CREVECŒUR, krāv'kėr, **Jean Hector Saint Jean de,** French agriculturist: b. Caen, France, 1731; d. Sarcelles, near Paris, 1813. He emigrated to America in 1754 and for some years lived on a farm near New York. In 1780 he was arrested by the English as a suspected spy and was confined for several months. He then went to Europe but returned in 1783 and was for a long period French consul at New York, where he enjoyed the friendship of Washington and Franklin. At London he published in English 'Letters from an American Farmer' (1782), which he translated into French under the title 'Lettres d'un cultivateur Américain' (1784). He wrote also 'Voyage dans la haute Pennsylvanie et dans l'état de New York' (1801). His works were translated into English and Dutch and have been greatly admired for the beauty of their style. Consult Tyler, 'Literary History of the American Revolution' (1897).

CREVILLENTE, krā-vēl-yān'tā, Spain, city in the province of Alicante, about 20 miles southwest of the city of Alicante. It is picturesquely situated at the foot of the hills, some 10 miles from the boundary of Murcia, and has an imposing town hall and a castle, formerly the possession of the Count of Altamira. Weaving and agriculture are the principal industries. Crevillente is supposed to have been founded by the Romans. Pop. 10,452.

CREW, Henry, American physicist: b. Richmond, Ohio, 4 June 1859. He was graduated at Princeton in 1882; after five years as instructor in physics at Haverford College, Pa., and astronomer in the Lick Observatory, was elected Fayerweather professor of physics in Northwestern University 1892; past president of the American Physical Society; member of the National Academy of Sciences; joint translator, with de Salvio, of Galileo's 'Two New Sciences' (1914). He has written 'Elements of Physics' (1899); 'Principles of Mechanics' (1908); 'General Physics' (1908, 1911); is assistant editor of the *Astrophysical Journal*, and has contributed important papers to the *American Journal of Science* and *Philosophical Magazine.*

CREW, of a ship: collective name for all the persons employed therein, but usually limited to designate petty officers and seamen only. In men-of-war, the entire crew are divided into five groups: (1) Commissioned and warrant officers; (2) chief petty officers; (3) first-class working petty officers; (4) second-class working petty officers; (5) able seamen, ordinary seamen, landsmen and boys. In the very largest war-steamers now afloat, there are upward of 152 different ranks, grades or offices among the crew, excluding officers and mariners. In sea-going passenger and freight steamers, the number of hands is relatively greater than in sailing vessels, owing to the various duties relating to the machinery; a steamer of 1,000 tons will have as many as 60 or 70 hands, if bound for a long voyage.

CREWE, Robert Offley Ashburton Crewe-Milnes, Marquis of, English statesman: b. London, 12 Jan. 1858. He was educated at Trinity College, Cambridge, was assistant private secretary to the Secretary for Foreign

Affairs in 1883–84, lord in waiting to the queen in 1886 and lord lieutenant of Ireland in 1892–95. In 1905–08 he was lord president of the council; in 1908 and 1912–15 lord privy seal, and Secretary of State for the Colonies 1908–10. In 1910–15 he was Secretary of State for India. In the latter year he again became president of the council. Besides several articles on Ireland, he is the author of a volume of 'Stray Verses' 1889–90; 2d ed., 1893).

CREWE, England, a town in Cheshire, 21 miles southeast from Chester, an important station on the London and Northwestern Railway, 158 miles northwest of London. It is quite a new town, having been as recently as 1842 an obscure village with about 200 inhabitants. The first portion of it was built by the railway company for the accommodation of its workmen. The railway works comprise forges, rolling-mills, locomotive and carriage works, rail works, Bessemer steel works, etc., and give employment to about 7,000 persons. It is one of the most important railway centres in the world, at which from 9,000 to 10,000 workmen are employed. The town gives its name to one of the parliamentary divisions of Cheshire. Pop. 44,960.

CREWEL-WORK, work executed with the needle, and consisting of designs sewed in colored silk or woolen threads on a basis of unbleached cotton or linen, toweling or the like. It is a kind of Embroidering. See EMBROIDERY.

CREYTON, krā'tŏn, **Paul,** a pseudonym sometimes used by John Townsend Trowbridge in the earlier portion of his literary career.

CRIBBAGE, a card game of an essentially skilful nature, played mostly by two persons, though three or four can be arranged for; with an ordinary pack of cards. Court cards and tens rank equal, all others according to their "pips," ace counting one. The game is to win 61 points. The scores are kept on a tally, each side of which is perforated with six groups of 10 holes each. Each player scores the points he makes by inserting a peg into the hole his count entitles him to, on the board. The cards being shuffled and cut, the dealer, from the undermost half of the cards, deals five to each player, beginning with his adversary. The remaining cards are placed face down on the cards already on the table. Both players then inspect the face values of their five cards and select two each to be thrown out. In this selection each is guided by the remaining cards he holds, and by the fact that whether or no, in the subsequent stage of the game (hereafter explained) he or his adversary will have the benefit of counting to his score the "thrown-out" cards. The non-dealer then cuts the cards left on the table again and the top card is turned face upward. From that moment, for that hand, this "turned-up" card forms, with the four cards "thrown out," what is known as "the crib," which the dealer in each game, after counting the points made off the cards in his hand, is entitled to add to his game. This turn-up card also is counted in the play of both players with the cards in their hand. In the ordinary course the non-dealer begins the game by laying a card down, face upward, on the table, of which he calls out the value. The opposing player has at once to determine how he can best utilize the card so played. There are several objects to be attained. You can so play as to ensure scoring yourself, or to prevent your opponents playing a next card, which will make all the pips played count 15 (for which he would score two points) or you can secure, or prevent, two or three tens being played in succession; or a sequence of three or four cards; or a flush, that is, three cards of the same suit; with a variety of other possibilities only to be learned by practice or close study of rules too intricate to be given here. When all the cards have been played, each player's hand, together with the turn-up, is counted for 15, etc. Then the crib or "thrown-out" cards and "turn-up" are counted for 15, and added to the score of the player entitled to it for that time. If neither party has scored 61 points, there is another similar deal and the game proceeds until one or the other does score 61. For rules and full particulars consult Cady, 'Cribbage' (New York 1897); 'Piquet and Cribbage' (London 1883); 'Foster's Complete Hoyle' (New York 1909); Spalding's 'Home Library' (1910).

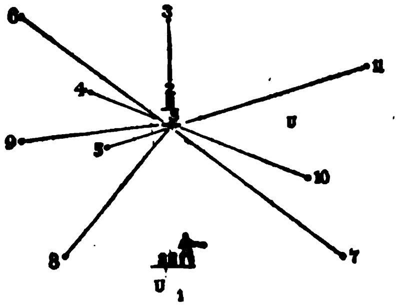
CRICHTON, krī'tŏn, **James,** surnamed THE ADMIRABLE, Scottish nobleman: b. Perthshire, Scotland, 19 Aug. 1560; d. Mantua, Italy, 3 July 1583. His father was a lord of session and through his mother he was of royal descent. He was one of the young men selected to be fellow-students of the young king, James VI, at Saint Andrew's University. He then went to France, where he continued his studies, and also, as he adhered to the Roman Catholic Church, took part in the war carried on by Henry III against the Huguenots. The beauty of his person, the strength and agility he displayed, joined to his multifarious accomplishments and surprising capacity for eloquent talk, made him the admiration of all. About 1580 he went to Italy, visiting Venice, where he was introduced to the Doge and Senate, created astonishment at Venice and Padua by his brilliant off-hand discourses on philosophy, theology and other high themes and his challenge to disputation in any of several languages and on either side of the controversy. He next went to Mantua and was appointed tutor to the son of a duke. Attacked in the streets one night by a party of men armed and masked, he overcame them by his superior skill, and recognized his pupil, to whom he at once loyally presented his sword. The young prince immediately ran him through with it. The authority for this account is the Venetian publisher Aldus Manutius, with whom Crichton had associated. W. H. Ainsworth wrote a romance founded on the story of Crichton in 1837. Consult Tytler, P. F., 'The Life of James Crichton' (London 1819; 2d ed., 1823); Crichton, Douglas, 'The Admirable Crichton: the Real Character' (ib. 1909); Whibley, 'Essays in Biography' (ib. 1913).

CRICKET, the name applied to orthopterous insects of the family *Gryllidæ*, allied to the grasshoppers. Their bodies are somewhat flattened, though in some forms more or less cylindrical, while the abdomen ends in a pair of long, slender stylets. The tarsi have three segments, the ocelli may or may not be present, and the ovispositor forms a nearly cylindrical needle with a slightly expanded tip. They are active leapers, the hind femora or thighs being enlarged. The males produce a shrilling sound made by raising the upper or fore wings and rubbing them on the hind wings. The noise is due to the clear drumhead-like area in the middle of the fore wings forming a resonant surface; on the hind wings is a raised toothed ridge which rubs on the drumhead above it. The females are silent. They are dull blackish brown. The European house-cricket (*Gryllus domesticus*) has been introduced into New York. It prefers the warmth of the hearth, while our native species live in the open air, the males beginning to sing at the opening of the summer season, which in southern New England is about the 10th of June. See MOLE-CRICKET; TREE-CRICKET.

CRICKET, a well-known game, commonly called the national game of England, played in the United States, Great Britain, Australia and India, the players being arranged in two contesting sides of 11 each. Strutt, one of the best English authorities on ancient sport, adduces some evidence to show that «club-ball,» played in the 14th century, may have been the parent of cricket, but both «cat-and-dog» (mention of which occurs in the 16th century) and «stool-ball» (frequently referred to in the 17th century) have a closer affinity. It is stated in Russell's 'History of Guildford' that cricket was played in that town in the middle of the 16th century, but for 50 years subsequently no trace has been found.

Cricket stands pre-eminent in England among the many outdoor pastimes pursued during the summer months. Cricket is not solely an affair of skill; chance is also a factor to a very large extent. Conditions of ground and weather exert such a remarkable influence on the game that in many cases a side which apparently possessed little hope of success has come out of a match victorious. Also a mistake in the field, or an act of carelessness on the part of a batsman, may change the character of the whole game. To excel at cricket it is necessary that the study of the game should begin early; and at nearly all schools a cricket «coach» or tutor is engaged.

Cricket may be played either single-wicket or double-wicket, but it is now so rarely played in the former manner that we can safely confine our attention to the latter. For a double-wicket match game 11 players on a side are necessary, and after the captains have tossed to settle who shall go to the bat first, the loser places his field and the winner sends in two of his surest, safest batters to defend the wickets and to make runs. The disposition of the field depends upon the style of bowling, whether it be fast, medium pace or slow and the following diagram will give a pretty clear idea of how the fielders are placed and what dangers the batsman has to guard against. A distance of 22 yards separates the wickets, and by this scale the relative position of the players may easily be estimated. The field having been duly placed, the batsmen having taken their stand, the empire calls «play,» and the bowler sends down his first ball. After five balls have been delivered from one wicket the umpire calls «over,» and the whole field changes about till the position of the men bears the same relation to the other wicket that it did to the one first bowled against. These «overs» continue to be bowled from alternate ends by different bowlers until the whole 11 players have tried their hand at the bat and been disposed of. Runs are made by the batsman driving the ball far enough away to give him time to change places with the other batter before the ball returns; each change constitutes a run. Six is the largest number of runs that can be made from a single hit, that being what is allowed when the ball is driven clear out of the grounds. The business of the bowler is to try in every possible way to knock down the wickets in front of which the batsman stands, or else to tempt him into hitting the ball up into the air so that it may be caught on the fly by one of the fielders. Besides being bowled or caught out, a batter may be «run out,» that is, have his wickets knocked down by the ball while he is busy making a run, or he may be «stumped out,» which is to have the same thing happen when he incautiously steps out of his ground to hit at a ball. The ball comes to the batter on the first bounce and the bowler's skill is shown in varying the pitch, speed and direction of the ball so that the batter may become bewildered and fail to defend his wickets. The best kind of bowling is what is known as «bowling with a break,» the peculiarity of which consists in that the ball after striking the ground does not continue straight on, but swerves sharply to the right or left like a «cut» tennis ball.



DISPOSITION OF THE FIELD IN CRICKET.

S, striker; 1, bowler; 2, wicket-keeper; 3, long stop; 4, short slip; 5, point; 6, long slip; 7, long on; 8, long off; 9, cover-point; 10, mid-wicket on; 11, leg; U. umpire.

The great point in batting is to play with a straight bat, that is, as far as possible to swing the bat at right angles to the ground, the advantage thereby gained being that the wickets are more completely covered and there is less liability of giving a catch. Next in importance is to play forward, that is, to meet the ball as far forward as safety allows and not wait for it to come upon one. Thirdly, it should be the batter's aim to play low; in other words, to hit as many «grounders,» or «daisy-cutters,» as possible, for they are harder to field and give no chance for a catch. Two whole days at least are required for a first-class two-innings match. In Canada there are clubs in almost every city, town and village. In the United States the two chief homes of cricket are in Philadelphia and Boston, although there are good clubs in New York, Detroit and elsewhere and also at some of the larger colleges. Consult Grace, 'Cricket' (1891); Daft, 'Kings of Cricket' (1893); Ranjitsinhji, 'Jubilee Book of Cricket' (1897); and Read, 'Annals of Cricket' (1897); Knight, 'The Complete Cricketer' (1906).

CRICKET FROG, a small frog (*Acris gryllus;* northern species are variety *crepitans*), abundant throughout the warmer parts of the United States, east of the plains, and noted for its rattling cricket-like cries in spring. It is about an inch long, brownish, with a blackish triangular patch between the eyes, the borders of which are light-colored, continued as a dorsal band to the rear end of the body; throat in spring yellow and legs barred; but all these colors change with surroundings, as the species possesses the power of metachrosis in a high degree. «The note of this species,» says Cope, «may be exactly imitated by striking two marbles together, first slowly, then faster and faster, for a succession of about 20 or 30 beats. The noise cannot be heard at a very great distance . . . it keeps on the high grass in and around marshy places, seldom if ever ascending trees or bushes. When pursued it leaps with prodigious agility and hides under water.» Their eggs are deposited in April, in little masses attached to the blades of coarse grass. A short time afterward all the great numbers which make the marshes so noisy in April and May die off, so that until the eggs hatch and the young «peepers» develop late in August, the species is practically extinct. Consult Abbott, ‘Notes on the Habits of the Savannah Cricket Frog,’ in *American Naturalist* (Philadelphia 1882) and Dickerson, ‘The Frog Book’ (New York 1906).

CRICKET ON THE HEARTH, a simple story by Charles Dickens, published 1845. It has been adapted for the stage and used by Joseph Jefferson.

CRIDGE, Edward, Canadian bishop: b. England 1817; d. 6 May 1913. He was graduated at Cambridge University; was appointed chaplain to the Hudson's Bay Company at Victoria, B. C., in 1855; and was first inspector of schools for Vancouver Island. His trial and condemnation for ecclesiastical offenses, before a court presided over by his bishop, Bishop Hills, had as its sequel his secession from the Anglican Church and appointment as first bishop of the Reformed Episcopal Church in British Columbia. In his last years he was afflicted with blindness.

CRILE, George W., American surgeon: b. Chile, Ohio, 11 Nov. 1864. He was graduated at Ohio Northern University in 1884 and received the degree of M.D. at Wooster in 1887, studied also in Vienna, London and Paris. He was lecturer on the principles and practice of surgery at Wooster University from 1889–1900, when he became professor of clinical surgery at Western Reserve University. In 1913 he was granted an honorary fellowship in the Royal College of Surgeons. His work, ‘On the Blood Pressure in Surgery’ (1903), is especially important. He published also ‘Surgical Shock’ (1897); ‘Surgery of the Respiratory System’ (1900); ‘Certain Problems Relating to Surgical Operations’ (1901); ‘Hemorrhage and Transfusion’ (1909); ‘Surgical Anemia and Resuscitation’ (1914).

CRILLON, krē-yôṅ, **Louis des Balbes de Berton de,** French soldier: b. Murs, Provence, 1541; d. Avignon, 2 Dec. 1615. In his first campaign, as aide-de-camp to the Duke of Guise (1557–58), he contributed much to the conquest of Calais. He subsequently distinguished himself in the battles of Dreux (1562), Jarnac and Moncontour (both in 1569), against the Huguenots. In the famous naval battle of Lepanto fought in 1571 Crillon displayed prodigies of valor and, though wounded, was appointed to carry the tidings of the great victory to the Pope and the king of France. The massacre of Saint Bartholomew (1572), the preparations of which had been carefully concealed from Crillon, was loudly reprobated by him. He fought heroically for Henry IV against the League and distinguished himself at the battle of Ivry (1590), and at the sieges of Paris and Laon. After the peace with Savoy, Crillon retired to Avignon. Consult Montrond, ‘Histoire du brave Crillon’ (Lille, 5th ed., 1874).

CRILLY, Daniel, Irish journalist: b. 14 Dec. 1857. He edited the *United Irishman,* Liverpool 1876, and joined the staff of the *Nation,* Dublin 1880. He represented North Mayo in Parliament 1885–1900 and has published ‘In the Byways with Young Ireland’ (1888); ‘The «Felon» Literature of Ireland’ (1889); ‘The Celt at Westminster’ (1892); ‘Pencillings on Parnassus’ (1899); ‘In the Footsteps of John Mitchel’ (1900–01).

CRIME, a word signifying in its legal acceptation any act to which the law attaches a penalty or punishment, without any reference to its moral turpitude. The common-law division of crimes was into treason (q.v.), felony (q.v.) and misdemeanor (q.v.). At present treason is usually classed as a felony and the distinction between felonies and misdemeanors hinges upon the degree of punishment prescribed for the crime, a felony being punishable by loss of life or by incarceration in a State prison for at least a year and by the deprivation of civil rights, and a misdemeanor being punishable by a fine or by imprisonment in a workhouse or by both. To constitute a crime, there must first be an act, since a mere opinion or intention, however wrong from a moral or religious point of view, if not carried into an act, cannot be treated as a crime, although the criminality of the act when done, may be partially or entirely dependent upon the intention of the actor. The true and only reason for making any given act a crime is the public injury that would result from its frequent perpetration. Each individual instance constituting an individual injury, frequent repetition would make it a social injury. Society accordingly takes the most efficient measures for its prevention, by appealing to the fears of mankind. The crime is first accurately defined and the requisite punishment attached to it and then government itself becomes a party to the prosecution of the offender, in order to ensure the carrying into effect of the penalty; for the certainty of punishment is even more effectual in preventing crimes than any degree of severity with a probability of escape. But while the only legitimate object of punishment is to protect society against a repetition of crimes, humanity dictates that the reformation of the offender should also, if possible, be effected. But as government has no concern with men, except as members of society, it is obvious that their moral improvement can never be made the primary object of punishment. Self-protection is at once the foundation and the end of the power exercised by society in punishing its members. In preventing the repetition of crimes, punishment is designed to operate both upon the individual offender and upon the community at large. Upon the offender himself it operates by physically disabling him from repeating the offense, or by dissuading him from it through the recollection of past suffering, or by both of these means together. Upon the community at large, it operates only by the terror of example. Consequently it follows that the mode and measurement of punishment are to be determined, not so much by the abstract nature of the offense as by its liability to frequent repetition, and also that no act should be punished at all, the repetition of which does not injuriously affect the temporal welfare of society. Insanity, infancy, coercion or duress may excuse an act otherwise criminal in the degree that they destroy the voluntary nature of the act, which is therefore performed by the agent without specific criminal intent. See CRIMINOLOGY; FINGER PRINTS.

CRIME AND PUNISHMENT (Prestupleniye i Nakazaniye). Dostóyevsky's greatest masterpiece in fiction, 'Crime and Punishment,' is the psychological study of a murderer. A law-student in the University of Petersburg has written for a periodical an article on crime. This has turned his attention to the subject, and as he has not been informed that the article was accepted, and as the small pittance that his mother and sister have been in the habit of sending him has inexplicably ceased coming, he is reduced to such straits that he has been obliged to pawn some of his possessions and is deeply in debt. The notion enters his head of murdering Alena Ivánovna, a disreputable old woman who lends money on pledges and is reputed to be as rich as a Jew. He dwells on the plan until it obsesses him. He argues that if great conquerors, like Napoleon and Alexander the Great, who had succeeded in winning fame and glory by their colossal crimes, were justified by their success, it would not be wrong for him to rid the world of a hard and evil usurer, and then, by taking the thousands of rubles which he should find in her possession, to pursue his career without the sordid cares that are blocking his way. He takes a hatchet, which he fastens by a loop to the inside of his cloak, and wrapping up a chip and a piece of iron as a pretended pledge, he goes to her apartment. Everything favors the accomplishment of his scheme. He finds the suspicious old woman alone, and while she is untying the knot around the package, he strikes her on the head and kills her. He hastily ransacks the inner room; he fails to find the great sums of money which are hidden about, but picks up a few pieces of jewelry and a pocket-book stuffed with bank-notes. While he is at work, the old woman's half-sister enters the outer room. He strikes her down also, and then, hearing steps, he for the first time thinks to bolt the door. Persons try to enter. They ring and knock, and suspecting something is wrong, go to find the janitor. Raskólnikof manages to escape. In order not to meet the two visitors coming back with the janitor, he steps into a room just vacated by two painters and there accidentally drops one of the jewel-cases. Undetected he leaves the house. Reaching his room he regards his booty, insignificant as it is, with a sort of horror. He goes to a deserted house and buries it all under a large stone. Returning to his room he discovers blood on his boots and on his clothing. He tries to get rid of all such incriminating evidence. He cannot, however, eliminate his conscience. His crime haunts him night and day. He becomes ill, and his friends cannot understand his actions, which are those of a crazy man. He is constantly impelled to visit the police-station and to revisit the scene of his crime. He is as yet safe from suspicion, since one of the two painters, who had left the apartment-house just about the time of the murder, has confessed to being the perpetrator. The examining-magistrate, who had read Raskólnikof's article, now published, and has a high idea of the young man's abilities, has gathered from his wild talk that he is the criminal: he advises him to confess and bear his punishment like a man; he intimates that his sentence will be mitigated by such action. In the meantime Roskólnikof has confessed his crime to Sónya, a girl of the town, the victim of cruel circumstances. He had met her through chance acquaintance with her father, an official degraded by drink, and had become greatly interested in her. Raskólnikof, finally, yields to Sónya's earnest entreaties, goes to the police station and is sentenced to eight years of hard labor in Siberia. The young girl accompanies him, and by her utter devotion brings him back to sanity and to complete repentance.

There are subordinate threads of plot, involving Raskólnikof's mother and sister and a wealthy roué, named Svidrigaïlof, who in spite of his rascalities has the saving grace of a generous spirit: he is a character worthy of Dickens. The episode of his suicide is depicted with startling power. So is the tragic end of Sónya's father. The scene of his funeral reaches the highest degree of pathos, mingled with a touch of sardonic humor. One of the most famous episodes in the story shows Sónya reading the New Testament to her unhappy friend: the prostitute and the murderer make a picture which haunts the memory by its realism and its dramatic poetry.

The power of the novel consists of the exhaustive analysis of the motives and reactions of a man who is on the verge of insanity and yet who is shown to be responsible for his deeds. Dostóyevsky had in his own life made a first-hand acquaintance with the lives of the poorest and most degraded people. He understood, as few have, their trials and temptations and he deploys before the reader a remarkable series of scenes in a style evidently greatly influenced by Charles Dickens as well as by Gogol, "the Father of Russian Realism." The descriptions of the murder, of the meeting of Raskólnikof and Marmeládof at the low *traktir*, where the drunkard tells his life-story, of the funeral-dinner given by Marmeládof's widow and the dramatic appearance of Sónya among the queer persons present, who draw back from her as from the plague, and of the life of the exiles in Siberia, which Dostóyevsky knew at first-hand — all these and many more are portrayed with a masterly pen. The beautiful and touching epilogue where Raskólnikof comes to himself lifts the tale from a wholly sordid, depressing, gloomy and pessimistic tragedy into the serene light of optimism: it fully repays for the long pages of hypochondriacal psychological analysis, which however microscopic and scientific are yet morbid and unwholesome.

'Crime and Punishment' was regarded as

the greatest literary event of the year 1866. It made a vast impression. It is said that it was immediately followed by a murder committed by a student at Moscow in almost precisely the same way as that described by Dostóyevsky. He himself remarked that he seemed "to be like a criminal who had committed some terrible deed that weighed on his conscience." It was anonymously translated into English from the French version and published in London in 1885, and in New York the following year. It forms the third volume of the complete works of Feodor Dostóyevsky from the Russian by Constance Garnett. It has been carefully analyzed by the Vicomte de Vogüé in his 'Russian Novelists' (Boston 1887) and by William Lyon Phelps in his 'Essays on Russian Literature' (New York 1916).

NATHAN HASKELL DOLE.

CRIMEA, krĭ-mē'ạ or krī-mē'ạ, The (Fr. *Crimée;* German, *Krim;* ancient *Chersonesus Taurica*), a peninsula forming the most southerly portion of the Russian government of Taurida on the north side of the Black Sea, separated from the mainland on the north by the Isthmus of Perekop, over three miles across, the Kertch Strait on the east separating the Black Sea from the Sea of Azov. It has a maximum length, east to west, of 200 miles, and a breadth of 130 miles from north to south, and is estimated to have an area of 9,700 square miles. It is washed on three sides by the Black Sea. The northern part of the peninsula is a continuation of the Russian steppes, with saline stretches, cold in winter and hot and dry in summer, with a disagreeable prevalence of dust storms. The southern littoral, sheltered by the Yaila-dagh or Alpine Meadow Mountains, is known as the Russian Riviera, has a climate Mediterranean in character, in which peaches, pomegranates, almonds and apricots grow to perfection. Here are the palatial residences of the Russian nobility, and Livadia, one of the tsar's palaces. The forests are of limited extent and seldom contain magnificent timber.

Among domestic animals the first place is due to the sheep, of which there are large numbers of fine-wooled breeds; horned cattle, horses and camels are also reared in large numbers. Of mineral productions the principal is salt, which is obtained from lakes in the saline tracts already referred to, in large quantities, and furnishes the material [illegible] an active trade, chiefly with the interior, [illegible] land transport. Other minerals are porphyry, ironstone and limestone. Fishing, shipbuilding, flour-milling, tanneries and soap manufacture are the principal industries. The Crimea is now included in the Russian government of Taurida. The chief towns are Simferopol (pop. 81,859) and Sebastopol (pop. 61,849) and the population is estimated at 855,000, the majority Turkish-speaking Tartars.

The history of the Crimea extends over 24 centuries, commencing with the earliest annals of Greece. It figures in Greek fable as Cimmeria. Greek settlements were made on the shores of the Crimea in early times; cities were built, one of them Theodosia, which still retains its name. The Bosporus finally became a dependency of Rome, and after the fall of the empire the settlements in the Crimea appear to have had a very precarious existence, at one time placing themselves under the protection of the Byzantine emperors, at another becoming the tributaries of some marauding adventurer and at another claiming to be their own masters. The time when some offshoot of the Turks first arrived in the Crimea is not well ascertained, but in the 7th century the greater part of it was in the hands of a Turkish tribe called Khazars, and had, in consequence, changed its name to that of Khazaria. In like manner its southern coast, where the Goths had established themselves, was called Gothia. The Crimea formed only a minute portion of the territories of which the Khazars had made themselves masters. Their capital was seated near the mouths of the Volga, probably not far from the present Astrakhan, and their sovereigns, called khazars or khans, lived in a state of splendor which the monarchs of western Europe have seldom equaled. In the 10th century the Russians and Pichengues come upon the scene, and before the end of it the power of the khans is almost broken. The Russian conquests were made chiefly in the north; the Pichengues, on the contrary, make their incursions on the south; and the Crimea, though still retaining the name of Khazaria, was obliged to receive them as its masters. The Pichengues, after maintaining their footing for above a century and a half, were forced to give way to the Comanes, who themselves were, in fact, fleeing before a race much more powerful than either. This was the Mongol Tartars, headed by the celebrated conqueror Genghis-Khan. The Crimea having been included in his conquests, passed, on his death, to his grandson, Batu-Khan, and in 1240 was incorporated in the great empire of the Golden Horde. Batu-Khan was the founder of Baktschi Serai, which continued long to be its capital. Mengli Timur, the second in succession from Batu-Khan, having granted the Crimea to a nephew, to be held as a dependency of the grand khanate, it took the name of Crim, or Little Tartary, from which that which it now bears is evidently derived. Previous to this time the Genoese had frequently visited its shores as traders, but they now applied to the under-khan for permission to form a permanent settlement. This was granted, and in consequence in 1280 they founded Kaffa, which is still known by its ancient name of Theodosia. The great object of the Genoese in making this settlement was to exercise a control over the extensive and lucrative trade which was then carried on with the East, by way of the Caspian Sea and the Volga, and thence, after a short land carriage, down the Tanais or Don into the Sea of Azov. This trade and a large business in slaves so increased the importance of this settlement that the Genoese, who had come as simple traders, began to aspire to be masters. The jealousy of their great rivals, the Venetians, was excited, and open hostilities were carried on, each party contending for an exclusive monopoly of the whole trade of the Black Sea. In this contest the Genoese gained the advantage, and they continued to follow it up by forming permanent settlements and erecting strong fortifications. In this way they obtained possession of Soldaia, now Soudak, in 1365, and about the same time made themselves masters of Cembalo, which afterward exchanged its name for that of Balaklava. The old castles at both these places are Genoese. While Genoa was thus a rising power, the khans were rapidly declining. To complete their downfall, the terrible Timur appeared, and early in the 15th century the great empire of Kaptschak or the Golden Horde was broken up into fragments. Early in the 15th century the Crimea thus became an independent khanate, and continued so to exist under the line of Gherai, descended from Genghis-Khan, for a succession of reigns. The Genoese in the meantime were growing in power, and succeeded, by interfering in a disputed succession, in gaining complete ascendency over the khanate. The Tartars invited the interference of Turkey, and 1475 an Osman fleet appeared in the Bay of Kaffa. The Genoese offered an ineffectual resistance; and Kaffa, along with all their other settlements, was soon in the possession of the invaders and the Crimea became a province of the Ottoman Empire. The Turks, not satisfied with the Crimea, extended their conquests far into Russia and provoked Russians reprisals, and soon Russia turned to the Crimea as a possible and valuable maritime province. In 1736 a Russian army of 50,000 men broke through the Isthmus of Perekop and made its way into Crimea itself. But the terrible climate forced the speedy return of less than half of the army, all that was left. The contest for the Crimea, thus begun, was steadily persisted in; and the conquest was virtually completed by the troops of Prince Dolgorouki in 1771. In 1783 the Crimea was united to the Russian Empire.

The Crimean War.— The progress of Russia in this direction naturally held out to her more tempting objects of ambition and it was generally believed by the western powers of Europe, who were jealous of the growth of her gigantic power and particularly by England, of whose policy, in consequence of her possessions in the East, the preservation of the Turkish Empire had become a primary object, that she aimed at the dismemberment of that empire and the conquest of Constantinople itself. Among other indications of aggressive tendencies, the great naval arsenal of Sebastopol, occupying the most commanding position in the Black Sea, at the extremity of the Crimean peninsula, begun by Catharine II in 1786, was completed on a scale of which the world has yet seen few examples and provided to an unlimited extent with all the means both of offensive and of defensive warfare. One main object of this arsenal undoubtedly was to hold out a standing menace against Turkey and make her destruction certain whenever an opportune period for striking the final blow should have arrived. The Emperor Nicholas I, one of the ablest as well as most ambitious of the tsars who have ever swayed the Russian sceptre, had satisfied himself that this period was actually at hand. In February 1852 the Porte had given a decision on a dispute between the Latin and Greek churches, the former protected by France, the latter by Russia, as to the protection of the holy places in Palestine, which was deemed favorable to Russia. A new demand, however, was made by this power, which in November claimed, in virtue of the Treaty of Kainardji, a protectorate over the Greek Church throughout the Turkish Empire. After complicated negotiations, the Porte, under pressure from France, vacillated toward the side of the Latins, and on 22 December delivered the key of the church of Bethlehem to the Latin patriarch. The diplomacy of England, France, Russia, Austria, Prussia and Turkey exhausted itself in negotiations over this dispute and at length, in May 1853, Prince Menschikoff delivered an ultimatum to the Porte, which being rejected, the Russian troops, which had been advanced to the Pruth at the close of the previous year, crossed it and occupied the Danubian principalities. The Porte declared war on 23 Oct. 1853; France on the 27th and England 28 March 1854. On 26 Jan. 1855 the allies were joined by Sardinia. Happily the common danger had dissipated all the misunderstandings which had arisen between Great Britain and France. Nicholas had selected the Danubian principalities as the scene of warfare and here the allied army was first conveyed; but after remaining inactive for some time at Varna and suffering great losses through cholera, it was determined that the Crimea should be made the great battlefield. Accordingly, in the beginning of September 1854, the combined fleets of Great Britain and France, forming up till then, if efficiency as well as vastness are considered, the mightiest armament ever conveyed by sea, appeared off the west coast of the Crimea, about 30 miles north of Sebastopol. The disembarkation having been completed on the 16th, the army began to move southward on the 19th and early on the 20th approached the banks of the Alma. Here the Russian army was found occupying a position which Prince Menschikoff, its commander, believed to be unassailable. After a sharp struggle the Russians were forced to give way at every point, leaving the allies in possession of a victory which is destined to hold an honorable place in military annals. Two days after the allied army continued its march for Sebastopol, the real object of attack; but for strategical reasons, instead of proceeding directly to the north side of the fortress, made a circuit which brought it considerably to the south, in the vicinity of Balaklava. This small harbor, near which the British were stationed, furnished them with facilities for landing the munitions of war, while the same object was gained, perhaps more advantageously, by the French at Kamiesch Bay. It has been alleged that an assault upon Sebastopol, had it been made immediately after the victory of the Alma, would probably have been successful. The defenses were, toward the sea, justly deemed all but impregnable, but those on the land side, from which the tsar had never dreamed of the possibility of an attack, were very incomplete. The allies, however, doubting the success of an assault, resolved to proceed in more regular form; and thus commenced one of the most remarkable sieges of modern times. The greatest skill, courage and perseverance appear to have been displayed both by the besiegers and the besieged. The latter were, however, in almost every respect the more favorably situated. The commissariat arrangements of the allies were deplorable; cholera decimated their ranks. Their munitions of war were almost unbounded; the northern side of the harbor was never invested, so that their communication with the country always remained open; and, contrary to the rule established in regard to siege operations, the number of troops within the town nearly equaled, and at one time greatly exceeded, the number of those who were attempting to take it. The consequence was that not only were defensive works constructed rapidly while the siege made comparatively little progress; but the besieged, who had also the assistance of an army without the walls, were able to assume the aggressive. On 25 October took place the famous battle of Balaklava, distinguished by the heroic charge of the Light Brigade, when, in consequence of the misinterpretation of an order, 600 cavalry rode headlong against the Russian army. On 5 November followed the battle of Inkermann, in which an overwhelming force of Russians was gallantly repulsed. Both Great Britain and France now became more alive to the magnitude of the struggle in which they were engaged. While the siege continued, other important positions in the Crimea were occupied and the possession of Eupatoria on the west, and of Kertch on the east, both seriously threatened the communications of the Russians and furnished the means of destroying a large portion of their supplies. The peninsula was thus virtually conquered and a successful issue of the siege began to be confidently anticipated. At an early period the Russians, by sinking a number of large ships across the mouth of the harbor, had rid themselves of the danger of an attack by sea. The remainder of the fleet within the harbor was still available for defense and from its powers of locomotion enabling it to change its position so as to meet emergencies, was able greatly to retard the besiegers. Decided progress, however, continued to be made. On 7 June 1855 the Mamelon, a commanding height, was taken; and on 8 September the flag of the allies waved on the tower of the Malakoff. The Russians on the night of the above day, aware that further defense was impossible, withdrew to the northern side of the harbor, after sinking their ships and blowing up the defenses of the town, which was now taken possession of by the allies. There is no reason to doubt that in another campaign the Russians might have been driven entirely out of the Crimea; but overtures of peace were made and they gladly availed themselves of them. A treaty of peace was concluded at Paris on 30 March 1856 by which the independence of the Ottoman Empire was guaranteed and her admission to the society (concert) of European powers declared by the other contracting parties, namely, Great Britain, Austria, France, Prussia, Russia and Sardinia; the Christians in Turkey to remain under the protection of the Sultan, who, by a firman, allowed them religious liberty; Russia renounced her protectorate over the Danubian principalities; the Black Sea was neutralized; the navigation of the Danube was to be free to all nations. The total casualties in the Crimean War have been estimated at half a million; the costs — Great Britain, £69,000,000; France, £93,000,000; Russia, £142,000,000. Taking advantage of the Franco-German War, Russia, on 31 Oct. 1870, denounced the Treaty of Paris so far as it related to the neutralization of the Black Sea, and in a conference held in London in January 1871 this part of the treaty was given up, while the remainder of the treaty was confirmed. Consult ‹Antiquités du Bosphore Crimmérien› (Saint Petersburg 1854); Beaulieu, ‹The Empire of Czars and Russians› (New York 1893); Telfer, J. B., ‹The Crimea and Transcaucasia› (1872); Wood, E., ‹The Crimea in 1854 and 1894› (1895). Crimean War: Kinglake, ‹The Invasion of the Crimea› (1863–87), and Hamley, ‹The War in the Crimea› (1891); Russell, ‹The War in the Crimea› (1855–56).

CRIMEAN WAR. See CRIMEA, THE.

CRIMINAL CONVERSATION, the technical term for adultery with another man's wife. It is no defense to an action by the husband, in such a case, that the wife freely assented to the defendant's solicitation, for the husband does not sue for a wrong done to her, but to himself. The gist of the action is the shame which has been inflicted upon him and the hazard to which he is subject of maintaining spurious issue. It is therefore quite distinct from the wrong of enticing the wife away from her husband, although, like seduction, it is looked upon as a personal injury to the husband. He may condone the wife's offense, and thus lose his right to secure a divorce, without affecting his right to damages against the paramour. It has been judicially declared that the law will not hold a party remediless for an injury of this kind because, through the exercise of Christian virtue, the influence of family interest, or for any other reason, he forgives an erring wife and trusts in her reformation and promise of future good conduct. He may forgive the wife without forgiving the author of the wrong done him. See ADULTERY.

CRIMINAL LAW. A definition of criminal law as that part of the law which relates to crimes and their punishment requires an explanatory definition of the term «crime.» A definition of a crime as an act or omission for which legal punishment may be inflicted upon the person in default would be too broad for practical purposes; for law in its very nature is coercive and all coercion at some stage involves the possibility of punishment. Calling crimes «wrongs» does not help matters. There are many acts and omissions which would not be accounted criminal, though they are considered wrongs, which result in injury to persons or property and are done in negligence and even with malice. The criminal law, therefore, in one of its most important aspects, is the law which defines crimes. Secondly, the function of the criminal law is to provide for the punishment of crimes. Thirdly, the criminal law prescribes the procedure whereby responsibility for crime is legally determined and the penalty admeasured and inflicted. Crimes may be either attacks on public order, abuses or obstructions of public authority, or acts injurious to the public good; or they may be attacks on the persons or property of individuals, or rights annexed to persons or property. In primitive communities, the law did not greatly concern itself with the redress of private wrongs. It was left to the injured individuals and their kinsmen to wreak vengeance on the offender and get what satisfaction they could through retaliation. The fear of private vengeance, indeed, was the only really efficient check upon crimes of violence. The earliest English method of criminal procedure, if it can be called so, was merely regulative of the right of summary execution accorded to one who catches a wrongdoer on his premises *flagrante delicto;* a thief might reclaim his life by paying *wer,* and, if he had obtained sanctuary in a church or in a demesne of the king, or of a bishop or a lord, and should be killed there during the prescribed days of grace, the slayer was obliged to pay a fine to the protector whose sanctuary had been violated. The privilege given to compose a feud by the payment of *wer-gild* to the avengers of a wrong was, in effect, a recognition of the right to redress by acts of violence a wrong done by the violent act of another. The idea that wrongdoing might injure not merely the individual directly affected but also the state was not grasped until much later times. During almost the whole Saxon period of English history crimes continued to be regarded as acts of war, and blood feuds and private warfare characterized a normal condition of society. The object of the law-maker was to reconcile antagonists upon established terms of peace rather than to put down violence by orderly legal process. The conception of the «King's Peace» as a state opposed to the state of private war began to gain currency, however, in the time of Alfred, although the laws of that king made liberal exceptions. A man could fight with or for his lord, for instance, and a lord could defend his vassal by force of arms without being answerable for a breach of the peace. But offenses against individuals, even homicide, involving serious menace to the general welfare, were still treated as merely private injuries to be compensated by damages. The foundation for a more enlightened system was being laid, nevertheless, and even while these barbarous institutions persisted, by laws ordering the local organization of the country by shires or counties, hundreds and parishes, for the purpose of police and the administration of justice. All men were bound to combine themselves in associations of 10, each of whom was a surety for the good behavior of the rest; and were likewise bound to produce any of their number charged with any offense or, failing in this, to make good any mischief he had done. This was the institution of «frank-pledge.» The Hundred Courts and County Courts corresponded with the local police organization, but in criminal matters the sheriff's *tourn* was simply the County Court held for a particular hundred. The court consisted of the parish priest, the reeve and four men from each township, also all lords of land and public officers of the vicinity,— for the County Court was the «Folkmoot» or general assembly of the people. But a representative body of 12 appears to have been constituted as a judicial committee of the court. Accusations might be made by this committee, the prototype of the grand jury, or by members of the Folkmoot, or by private accusers. The guilt or innocence was decided by compurgation, or by ordeal if the accused was not «oath-worthy.» Whether the compurgators examined witnesses before they «dared» to swear is uncertain, but it is inconceivable that an inquisition into the facts should not have preceded the verdict. By the time of the Norman Conquest the killings and burnings in private wars and blood feuds had become almost extinct; the introduction of trial by battle in the reign of William the Conqueror, therefore, was an apparent reversion. Indeed, the language of the royal *carta* by which this was instituted shows that it was so intended, and that trial by battle was merely private war under regulations. By William and his immediate successors the supervisory powers of the King's Court were greatly increased and its concurrent jurisdiction was exercised more stringently and frequently until, ultimately, the King's Assizes practically displaced the County Court in the exercise of the more important part of its criminal jurisdiction. Criminal actions up to the time of Edward I (reigned 1272–1307) were instituted by «appeals» to the County Courts and proceeded from private initiative, not from the Crown; this was so even in regard to such serious offenses as homicide, arson and rape. In form the criminal appeal was a wager of combat, the appellor offering to «prove by his body» the justice of his cause and the appellee likewise undertaking «by his body» to defend himself against the accusation. If the appellee succeeded in defending himself until the stars came out, he was acquitted; if defeated, he was hanged. But it was left to the viscount and coroners to determine whether the appellee «ought to have the country,» meaning, probably, an inquisition by the judicial committee of the County Court (grand jury?) and a determination of the facts on the testimony of witnesses by petit jurors or compurgators.

Neither the ancient laws, decreed on the sole authority of the kings, nor the earlier acts of Parliament yield much to those who go to them in search of definitions of crimes. Their administrative and regulative provisions assume a knowledge on the part of the law officers of what characterizes a criminal offense and distinguishes it from a trespass. The forms of procedure devised by the courts, however, are more helpful to a historical study of the development of the criminal law. From a number of forms of appeals given by Bracton in his 'Leges Angliæ,' it appears that in his day the idea of a crime being an infraction of public order as well as an invasion of private rights had been definitely accepted. The appellor was required to allege that at the time of the injury suffered, whether abiding at home or traveling on the king's highway, he was «in the peace of the lord king,» that the defendant «came with his force against the peace,» in felony and in «premeditated assault.» Violence, feloniousness, malice and premeditation have in all times been considered necessary constituents of any serious criminal act. Returning to Bracton we find that, if the injury inflicted was a wound, the appellor must describe it with exactitude and state upon what part of his body it was received; also the kind of weapon with which it was inflicted. It seems that only with weapons that cut and pierced could an assault be made that would be accounted felonious. If one were injured from a blow with a bludgeon or the bare fist, such as would ordinarily cause merely a bruise or a welt, unless bones were broken, it was regarded a «minor and lighter» offense, answerable in a civil action though even such lesser wrongs would «appertain to the crown, for sometimes they are against the peace.» An appeal for mayhem would lie only for injuries that would disable the appellor «for fighting.» Certain crimes, as homicide and arson, were «inexpiable,» subjecting the perpetrator to capital punishment, or to mutilation in the case of rape. Killings or fires resulting from accident or negligence, and not caused with malicious design, were not so punished. Bracton says «against such (offenders) a civil action lies.» Thus early (Bracton's book was written about 1258) did the law clearly recognize the distinction between «felonies» and «misdemeanors,» which has subsisted to this day. Thus early was «intent» estimated at its true value as an element of criminality. Not for the first time in English history, however, was such recognition then accorded to these principles. The Saxon laws directed a less compensation to be made for accidentally causing a death than where the killing was an act of volition; and in the laws of the Norman, Henry I, son of the Conqueror, there is a general provision that «one who does amiss unknowingly is free of guilt.» The common-law crimes against private proprietary rights were those involving destruction of property, as arson, and those depriving the owner of its possession, as theft. The former was a capital crime and the latter, the perpetrator being of the age of puberty, and the property taken being above a few shillings in value, was also punishable with death. The malicious burning of a domicile, strictly speaking, is an injury to the person of the owner, being regarded as an attack on his life. The commission of larceny in the night (burglary), or with accompanying violence to the person of the victim (robbery) were aggravated forms of the offense, justifying the summary killing of the offender. Land, under the feudal system, being held in tenure of the king or lord, and not owned, was not susceptible to theft; anyhow, a thief could not conveniently carry away an earldom or even a farm. But this insusceptibility of real estate to appropriation by larcenous taking was extended to the appurtenances thereof. So, while it would be a larceny to steal a sheep from the fold or an apple from the tree, these things being chattels, one might carry away any part of a house, or even jack up and remove the entire structure, without committing a theft at common law. The principal crimes against the government mentioned in the early laws were: plotting against the king's life or the harboring of exiles who plot; plotting against a lord, fighting in the king's house or breaking the king's peace in tumult and riot; also contempt and disobedience of lawful authority, especially by public officers, possibly the basis of the law of impeachment for malfeasance. Breach of the oath of fealty to the sovereign and making head against him with force of arms was treason and rebellion, severely punished when unsuccessful. Of crimes against public justice, perjury is several times mentioned, and of offenses against the police power «coining» is attended to at a very early date. Usury originally was an offense under the canon law of which the ecclesiastical courts took cognizance exclusively, until a compromise was made between the king and the bishops and embodied in act of Parliament (15 Edward III, Chap. 5), the usurers dead belonging to the king and alive to the bishops. Usury was finally declared a thing unlawful (by 37 Henry VIII, Chap. 9), repealed in the time of Edward VI but revived in 1570 (by 13 Elizabeth, Chap. 8). The law of 25 Edward III, St. 5, Chap. 1, is still the standard act on which law of treason is based. In fact, by the end of the reign of this monarch (1377), we find the criminal law of England practically complete, in outline, with respect to its substantive provisions as well as with respect to the organization of the courts and their procedure. The King's Bench had obtained a much more than supervisory jurisdiction over the County Court and when the king's judges came into a shire their jurisdiction in criminal cases was practically exclusive. The County Courts, no longer the Folkmoot, were composed of selected county magistrates. Twenty-three of these were told off to form a grand inquest, or jury, of which 12 would constitute a *quorum*, while the whole body would be the custodian of the rolls — *custos rotulorum*. Shakespeare shows his wisdom of the law when he permits Robert Shallow, Esq., in the county of Gloucester to call himself «justice of peace and *coram*, aye, and *cust-alorum*,» titles which the popular wit of a later age has further travestied and transmuted into «high cockalorum.» Criminal prosecutions by private appeal continued in vogue, however, long after the institution of grand juries and pleas of the crown. In 1482 the judges of all the benches unanimously directed that one indicted for murder «shall not be prosecuted at the King's suit for a year and a day»; every indictment was to be stayed until the suitor had his opportunity to prosecute his appeal to trial by battle. This remarkable piece of judicial legislation was repealed by statute (3 Henry VII, Chap. 1) which provided that because «the party is often slow . . . and at the end of the year all is forgotten,» indictments for murder shall be tried at once, but acquittal was no bar to a private suitor's appeal. This form of action, however, fell out of use, though an appeal for murder was instituted as late as 1818. Nothing came of it, the appellor declining to fight, and in the following year (59 George III, Chap. 46) private prosecutions of criminal offenses were definitively abolished. When an accusation presented by the officers of the crown has been endorsed by the grand jury a «true bill» it becomes an indictment. A majority of not less than 12 jurors is necessary to a finding, hence the practice of drawing 23 men to the grand jury, so that 12 may be the smallest possible majority. The indictment derived its preciseness of form from the appeal, on which it is modeled. Any variance between the statement made by the appellor to the coroner and that made to the judges was fatal. The same strictness of rule applies to the indictment. The requisites of an indictment at common law were: the *venue*, which was important as showing whether an action was brought in the proper jurisdiction; the *statement*, which sets out all the ingredients of the offense charged; the *conclusion* which was merely a form, of no importance whatsoever, and is now generally omitted. In other respects a modern indictment does not differ greatly from one of the earliest times. A history of the criminal law in England leads through a maze of refinements in special pleading and of capricious and casual legislation. The many definitions of crimes, made at various times within the five or more centuries past, naturally were not always consistent, while the subtleties and technicalities of the special pleaders were often ridiculous. Many of the rules of pleading were, in effect, legislative acts as Chief Justice Coke's specification of the three degrees of criminal intent that must be set forth in various forms, as of absolute certitude, reasonable assurance, and betwixt and between. Practically the same in effect as an act of Parliament, also, was Sir Matthew Hale's doctrine that with respect to theft, one who carries stolen property from place to place goes on stealing it in each place he takes it to, so that he may be indicted in every county to which he conveys it. The ancient theory of trial by the vicinage was carried so far that, if a man received a fatal wound in one county and died in another, the slayer was indictable in neither. This defect was remedied by the statute of 2 & 3 Edward VI (Chap. 24, 1548); but many other and quite as serious abuses were permitted to continue. There was no limitation of time in which a criminal action could be instituted. Eugene Aram was convicted and executed 20 years after the murder of Clarke and Sir James Fitzjames Stephen, when a young barrister, held a brief as prosecutor where the offense charged was the abstraction of leaves from a parish register 60 years previously. An early instance of the application of the «higher law» is a case, cited by Hale in his «Pleas of the Crown,» of a man indicted for a murder in 1672. The person killed was caught in the act of adultery with the slayer's wife, and it was resolved by the whole court that this was manslaughter. The accused had «benefit of clergy» and, though he was branded in the hand, the court directed the executioner to «burn him gently, because there could be no greater provocation than his.» Beginning with the 19th century in England and even earlier in America the rigors of the substantive law relating to crimes and penalties and the intricacies of criminal procedure became the subjects of ameliorative action and simplifying regulation, by legislative enactment and, in less degree, by judicial rulings. But until quite recently the unwritten law covered: principles relating to extenuation and justification of criminal acts; the definition of murder, manslaughter, assault, theft, including larceny by trustees and bailees, and by fraud; forgery; perjury and libel; and the whole law of procedure. To some extent, this unwritten law has been reduced to statutory form, particularly since the middle of the last century, but systematic codification has been carried out in only a few places and hesitatingly. The 'Penal Code' and 'Code of Criminal Procedure,' prepared by David Dudley Field and others under commission from the New York legislature, lay neglected for a generation before they were adopted. These have since found acceptance in other States; and in still other States and also in the Federal Congress, more or less systematic revisions of the statutes relating to crimes and procedure have taken place. The 'Draft Criminal Code' prepared by Sir James Fitzjames Stephen in 1878 and introduced in the British Parliament the following year, after revision by a commission consisting of Lord Blackburn, Justice Barry, Lord Justice Lush and the author, has been gathering dust in committee ever since. In his draft the substantive law and procedure are treated as an inseparable unit, because of the inter-relation of the two parts. The division of the whole body of criminal law into substantive and remedial law or procedure is natural, however, and in accordance with the plan followed by all modern codifiers and analytical writers from Beccarria and Bentham to the end of the alphabet. Thomas Erskine Holland would divide the substantive criminal law itself into two parts. The first and more general part should deal with (1) the nature of criminal acts; (2) responsibility of the wrong-doer on the ground of intention or negligence; (3) facts negativing responsibility, as non-age, compulsion, idiocy, lunacy or drunkenness; (4) facts in justification of acts otherwise criminal, as consent of the injured party, self-defense, provocation, lawful authority or the public welfare; (5) a list of punishments, hard labor, whipping, loss of civic rights, liability to police supervision or pecuniary fine; (6) the period of time which would bar prosecution; (7) aiding and abetting crime; (8) criminal attempts; cumulative punishments. The distinction between felonies and misdemeanors, now become meaningless, might be superseded by a distinction between indictable offenses and others. In the second and more special part should be contained a classification of criminal acts and the penalties provided for each. Criminal acts are divided into offenses committed directly against the state or the community in general, and offenses the mischief of which is directed primarily against particular individuals. The state or community in general may be injured by (1) acts tending to interrupt its friendly relations with other powers, under which head would be included our Federal laws against «filibustering» and the like; (2) acts tending to subvert the government, as treason and rebellion; (3) acts tending to the subversion of the liberties of the citizens; (4) riots and other offenses against public order; (5) abuses of official position; (6) resistance or disobedience to lawful authority; (7) obstruction to the course of justice by perjury or the falsification of documents, or by the rescue or harboring of defenders; (8) offenses relating to the coinage or to weights and measures; (9) acts injurious to public morality, as bigamy or adultery; (10) acts injurious to the public health, such as non-compliance with ordinances to prevent the spread of epidemics or the maintenance of nuisances. The wrongful acts primarily affecting individuals may be classified as follows: Violence to the person in various degrees of homicide, or by wounding, rape, assault or imprisonment; (2) defamation of character. libel, etc.; (3) offenses against family rights, such as the abduction of children; (4) offenses against possession and ownership, such as theft or embezzlement or the wilful destruction of property, as by arson; (5) forgery and breaches of contract of a kind likely to cause social inconvenience; (6) fraudulent misrepresentation and swindling. The rules whereby the machinery of courts is set in motion for the punishment of offenders, and classified under the head of criminal procedure, usually are of two species. The more solemn proceedings for the trial of serious crimes have been described in the historic part of this article. A simpler form of proceeding is by summary process before a minor magistrate or even an administrative or police official. This method is applicable only to trifling transgressions, unless the accused should consent to this manner of disposal in a matter of greater consequence. Many of the offenses over which minor magistrates exercise summary jurisdiction consist in the breach of statutory regulations to prevent petty nuisances, or of ordinances passed by municipalities or other public bodies, under legislative authority, or to enforce the execution of administrative measures of public importance. Among the latter are provisions subjecting parents to fines for not sending their children to school, numerous punitive ordinances for violations of regulations of boards of health, of traffic rules made by the police, building regulations, etc. These make an increasingly important part of our legal system and are too characteristic of modern tendencies to be passed over even in a necessarily brief survey of the penal law. They defy classification and a bare allusion to them, in order to round out this article, must suffice. See CRIMINOLOGY; BURGLARY; BIGAMY; JURISDICTION; HOMICIDE; COUNTERFEITING; PERJURY; LIBEL; RAPE; MALICIOUS MISCHIEF; TREASON; PENOLOGY.

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CRIMINAL SOCIETIES. See SOCIETIES, CRIMINAL.

CRIMINOLOGY is the scientific study of crime and the criminal. It is not one of the fundamental sciences, but is a hybrid product of several sciences. Zoology, anthropology, history and sociology furnish the facts for a description of the nature, origin and evolution of crime. Meteorology, demography and the special social sciences, such as economics, politics, etc., contribute to the analysis of the environmental causes of crime. Anatomy, physiology, psychology and psychiatry furnish the facts and methods for the study of the traits and types of criminals. Comparative jurisprudence and law contribute to the study of the penal treatment of the crime and the criminal.

The subject matter of criminological science may be grouped into the following principal branches:

(1) Theory of the nature and evolution of crime; (2) criminal sociology; (3) criminal anthropology; (4) criminal psychology; (5) criminal jurisprudence; (6) penology.

The study of criminology has great sociological significance and practical value. It furnishes one of the most striking illustrations of the relation between the individual and society and of the conflict between individuals and social interests. Punishment of the criminal is the most drastic form of social repression, and criminology is essentially a study of social control. Consequently, criminology and ethics are closely related, and the study of crime and the criminal involves the discussion of numerous ethical problems of great social importance and scientific interest.

Equivalents of crime are to be found among animals. The mammals and birds share many of the instincts and feelings possessed by man. In each of these animal species habits and customs arise which in the long run aid the survival of the species. Acts which are contrary to these habits and customs will usually be injurious to the species, and therefore are reacted against by members of the species. The study of the primitive peoples has shown that violations of customs constituted some if not all of the primitive crimes. In most cases the laws of the higher stages of social evolution have developed out of the customs of the community, and even down to the present day changes in the laws are determined mainly by changes in the customs. Other forces which have influenced greatly the evolution of crime have been magical practices, religious beliefs, public opinion and moral ideas. Some of the primitive crimes were treason, witchcraft, sacrilege, incest, poisoning, breaches of the hunting rules, etc. These offenses were punished sometimes through private vengeance, in other cases by means of penalties inflicted by the primitive community, such as death, banishment, etc. As civilization developed, government as an organized mechanism of social control came into being. The written law now specifies the acts which are to be stigmatized and punished as criminal, and thus gives formal expression to the customs and beliefs of the civilized community. Private vengeance has been gradually eliminated, and the government now exercises its police powers by imposing the penalties prescribed by the law through an elaborate system of courts, prisons, etc. Thus a crime in a civilized community may be defined as an act which is forbidden and punished by law, which is almost always immoral according to the prevailing ethical standard, which is usually harmful to society, which it is ordinarily feasible to repress by penal measures, and whose repression is necessary or is supposed to be necessary to the preservation of the existing social order.

Cosmic and Social Factors in Crime.— The forces in the environment which give rise to criminal conduct are numerous and complex. Climate, season and the weather have a good deal of influence upon crime. Many statistics have accumulated which indicate several definite correlations between these telluric conditions and the extent and character of crime. As a general thing, crimes against the person increase with a rise in temperature. Crimes against property, on the contrary, usually decrease with a warmer temperature and increase as the temperature falls. Atmospheric pressure, winds, humidity and other meteorological factors also have a discernible effect upon criminal conduct. But all of these factors have perhaps an even greater indirect influence, namely, through their influence upon industrial and social conditions. Economic activities are determined to a large extent by climatic and seasonal factors, and these activities determine in turn wage rates, unemployment and other occupational conditions. The struggle for existence for mankind has assumed, to a large extent, an economic form. It has become a struggle to obtain the commodities needed and desired within the system of production based upon the division of labor and exchange. Most of the criminal activity, therefore, arises out of the economic struggle, while all of it is conditioned by the economic environment. The influence of economic forces upon criminality may be studied in at least four ways. In the first place, fluctuations in the extent of crime may be correlated with economic changes. In the second place, the economic crimes, namely, the crimes in which economic motives are predominant, may be studied. In the third place, the economic status of criminals, namely, their position with respect to the distribution of wealth and occupations, may be studied. In the fourth place, professional criminality may be studied.

The results from such study are varied and complicated and sometimes rather conflicting. A few of the outstanding facts, however, may be summarized. As a general rule, crimes against property increase with a rise in prices or with a fall in wages. Changes in prices and wages affect materially the economic welfare of the vast majority of the population. So that there is, apparently a causal relation between economic welfare and crimes against property. The analysis of statistics of crimes shows that the so-called economic crimes, in which economic factors predominate, constitute from two to three-fifths of the total number of crimes. Furthermore, economic factors play a part in the causation of many of the other crimes. The analysis of statistics of criminals shows that a disproportionately large number of criminals come from the poorer classes and from the occupations of the poorer classes. The study of the careers of professional criminals reveals the fact that it is economic pressure early in life in the form of a struggle for subsistence or for a higher standard of living, and resulting usually in inadequate intellectual and moral training and association with bad companions, which leads many of these professional criminals into their first crimes.

But the economic forces are not the only factors of the social environment which influence criminality. Political conditions have much influence upon crime. Inefficient and corrupt government encourages greatly the increase of crime. Honest and efficient government discourages crime, especially if it adopts and carries out successfully far-reaching measures which remove some of the economic and other causes of crime. In fact, according to those who take the socialistic point of view, the extent of crime depends very largely upon the nature of the political organization of society.

Religion, science, art, the press, education and many other features of our modern civilization have their influence either for or against crime as the case may be. A rapid increase of population tends to increase criminality by accentuating the economic pressure. In fact, some criminologists have believed that the advance of civilization in general has increased crime. Comparative statistics of crime have furnished some evidence that this is true. If so, it is probably due to the facts that human life has become much more complex and that ethical standards have risen, thus resulting in stigmatizing many more acts as criminal. But this apparent increase is probably due in part to the fact that the law is being enforced much more rigorously now than it was in the past. The modern forces of criminality are to be witnessed in an accentuated form in the cities. Criminal statistics reveal a great preponderance of crime in the cities as compared with the rural communities. The urban concentration of population has created new conditions in which more regulations are necessary to harmonize the conduct of individuals with each other. Much of urban criminality is due to violations of ordinances with respect to tenements, factories, sanitation, etc., which are unnecessary in rural communities. The complexity of the urban environment makes it difficult for social groups to function normally. Persons weak in mind or character find it particularly difficult to adjust themselves in the city. Furthermore, many kinds of crime can be committed only or best in cities, such as pickpocketing, some kinds of burglary, blackmail, embezzlement, forgery, fraud of various kinds, etc. It is also more feasible for the criminal to live and hide himself in the city than in the country. Most of these forces which accentuate urban criminality also increase urban vice.

Individual Factors in Crime.— Many of the causes of criminality are to be found within the criminals themselves. Lombroso gave excessive weight to these traits. As a result of his anatomical and physiological studies, he formulated his theory of the "born criminal." He found certain malformations of the skeleton and of the viscera and several abnormalities in the physiological processes unusually prevalent among the criminals he examined, and arrived at the conclusion that they constituted the traits of a distinct biological and anthropological type which is prone to become criminal. He also concluded as a result of a study of the equivalents of crime among animals and among primitive men and of the traits and conduct of children, that this congenital criminal type is to a large extent an atavistic type.

Lombroso seems to have been rather ignorant of the modern science of biology, and especially of the theory of heredity. Biologists recognize that atavism, or reversion, takes place when there reappears in an individual a trait of an earlier type, provided that this reappearance is due to hereditary forces. That is to say, if primitive traits which have long remained dormant reassert themselves in the germ plasm at the time of conception, there is a true case of reversion. But a perusal of Lombroso's writings shows that many of the criminal traits which he calls atavistic are not hereditary in their origin, but are cases of arrested development either before or after birth. In other cases he characterizes as atavistic certain habits which have been transmitted by social agencies. In fact, Lombroso's exposition of his theory of the born criminal indicates that he probably believed in the hereditary transmission of acquired traits, though he nowhere explicitly states his opinion on this point. But he again and again speaks as if habits, or the effects of habits, are transmitted by hereditary means. The consensus of opinion among biologists to-day is that no acquired traits can be transmitted by hereditary means. It is obvious that there can be no "born" criminal in the literal sense of that term. No person is a criminal in the strict legal sense until he has committed a criminal act, and no one could commit such an act until several years after birth. Furthermore, no person is predestined from birth to become a criminal on account of his congenital traits, because criminality depends in part upon environment and social status.

So that the theory of the born criminal must be relegated to the limbo of discarded theories, and it is futile to attempt to identify a criminal type solely by means of anatomical and physiological traits. The study of these external, physical traits is of significance only when correlated with the internal traits, namely, the mental traits.

The physical basis of mind is neural. All of the mental phenomena, namely, the instinctive, the affective and the intellectual phenomena, take place through the agency of the nervous system. The instincts function, in the first place, because stimuli from sense organs pass over nerve fibres to the central nerve cells which constitute the centres for the instincts in the central nervous system. These centres are probably located mainly in the spinal cord, the medulla and the cerebellum. The instincts function in the second place, because impulses are sent out from these centres and travel over nerve fibres to the muscles which perform the instinctive acts. Feelings are possible only where nerve fibres are present, and probably arise mainly as a result of stimulation of the sympathetic nervous system. The intelligence is localized in the association areas of the cortex of the brain. Consequently, inherited variations in the nervous system may give rise to exceptional strength or exceptional weakness of some of the instincts and feelings. In similar fashion, use or disuse may lead to acquired variations which may in turn result in the accentuation or inhibition of instincts and feelings. It is doubtless true that some persons are born with traits which make them peculiarly disposed to commit crimes if their environment is conducive to criminal conduct, and a portion of the criminal class is recruited from this group. Thus abnormal variations may take place in sensory, motor or central nerve centres which make certain instincts stronger or weaker. Or variations may take place in sensory or central nerve centres, or in some of the viscera, which change the feelings in such a fashion as to lead to criminal conduct. Or variations may take place in the cortex of the brain which weakens the intelligence. Some of these variations are hereditary. But many of the anatomical and physiological traits which are abnormal from the time of birth are more likely to be due to irregularities in the development previous to birth, such as are due to pressure on the brain, ill-nutrition, etc. Sometimes these abnormalities do not appear until later in life, but are due to congenital weaknesses which constitute a diathesis or predisposition for acquiring these abnormalities. These abnormal and pathological traits result in abnormal conduct of all kinds. The excessive strength or weakness of some of the instincts furnishes a powerful impulse toward crime, or removes a powerful restraint which acts upon most persons. In similar fashion, the excessive strength or weakness of some of the feelings furnishes a powerful impulse toward some kinds of criminal conduct, such as crimes of passion, or removes the restraint from certain other kinds of criminal conduct. The weakness of the intelligence makes it difficult or impossible for the ament or feeble-minded person to understand the nature of or the justification for the regulations and restrictions imposed upon him by society. Owing to these abnormalities, the individual does not succeed in adjusting or adapting himself to social life, or, at any rate, to the life of the society to which he belongs. Recent investigations indicate that in all probability a minimum of 5 per cent of criminals are aments, and that there are probably at least 10 times as many aments proportionally among the criminals as there are in the population at large. It is even more difficult to estimate the number of psychopathic criminals. Among these are the demented, the insane and the neurotic criminals. Dementia precox characterizes some of the younger criminals. Manic-depressive insanity and paranoia are more or less prevalent among the insane criminals. Epilepsy characterizes some criminals. Hysteria, neurasthenia and psychasthenia are other neuroses which are found among criminals probably much less frequently than epilepsy. Bad habits, such as alcoholism and drug habits, excessive suggestibility, mental conflicts and repressions, etc., are other abnormal traits which give rise to criminality or at least aggravate it.

There is obviously no hard and fast line between the different criminal groups. On the contrary, there is an almost infinite degree of gradation between the different types. This extensive gradation is due, on the one hand, to the large amount of variation in the traits of individual criminals, and, on the other hand, to the great variety of circumstances under which crimes are committed. However, the following is an accurate and useful classification of the principal types of criminals: (1) The criminal ament or feeble-minded criminal; (2) The psychopathic criminal; (3) The professional criminal; (4) The occasional criminal, (a) The accidental criminal, (b) The criminal by passion: (5) The evolutive criminal; (6) The political criminal. The distinctions of age and of sex are of importance in the study of the criminal. The criminal traits of the young are of significance not only for their own sake, but also because of the light their study throws upon the corresponding traits of adults. Many criminal careers begin in childhood or early youth. And even when a criminal career begins after maturity has been attained, the experiences and influences of early youth frequently aid in explaining the later criminality. Criminal statistics indicate that criminals are astonishingly precocious. The criminality seems to be higher relatively at about the time maturity is reached than at any other age period. Furthermore, there is some reason to believe that juvenile crime has been increasing rapidly in civilized countries during the last few decades. Consequently, it is important to study poverty, parentage and home life, education, recreation, immigration, etc., in relation to juvenile criminality. Criminal statistics indicate a great preponderance of male over female criminality. In fact, in some civilized countries there is from four to six times as much male criminality as there is female criminality. But this difference is in part misleading. In the first place, woman is favored in the repression and treatment of crime, thus lowering somewhat the statistics of her criminality. In the second place, there are many more extra-judicial female crimes than there are extra-judicial male crimes, because many female crimes are crimes of complicity which are more difficult to detect than overt crimes. In the third place, prostitution serves in a measure as a female equivalent of crime. In so far as female criminality is actually less than male criminality, it is not due to any appreciable moral difference between the sexes. It is due in part to the physical disabilities of woman which restrain her from committing certain kinds of crime. But it is due mainly to the fact that woman is very largely shielded from criminality by her secluded life in the home. Consequently, it is to be expected that as woman's position becomes more like that of man her criminality will increase, and the available statistics seem to indicate that her criminality is increasing as she is attaining a greater degree of economic independence. Criminal law and procedure, the fundamental objects of punishment, penal responsibility, the principle of the individualization of punishment, the indeterminate sentence, suspension of sentence, probation, etc., are described under the title, CRIMINAL LAW.

Modern Treatment of the Criminal.— The statistical method is very useful in criminological research and is ancillary to all of the other criminological methods. It is of utility in the study and analysis of most of the causes and conditions of crime and has great value for measuring the effects of the different kinds of penal treatment. Unfortunately governments have not usually collected as many or as reliable criminal statistics as would be desirable. Especially true is this in the United States. In some of the States scarcely any of these statistics are gathered, while there is no adequate system of collecting and publishing statistics of crime as a national problem. So far as we can judge from the statistics available in the leading civilized nations there has been an increase of crime during the past few decades. It is, therefore, concluded by some persons that civilization has had a harmful effect. However, this conclusion is not necessarily justified. Owing to the great increase in the complexity of human life due to the progress of civilization, the category of criminal acts has been greatly extended so that it is possible to commit a much greater variety of crimes now than has been possible in the past. Furthermore, owing to the increase in the efficiency of government, many of the old criminal laws are enforced now much more rigidly than in the past. The apparent increase of crime in modern times in civilized countries is doubtless due in part to these two factors, and may be entirely due to them. The most drastic form of penal treatment is death. Capital punishment was much used in the past. It is little used to-day in civilized countries. Owing to the modern humanitarian movement, which has enhanced greatly the value of human life in the popular estimation, there is much opposition to the death penalty, and it will probably disappear entirely in course of time. Imprisonment is the characteristic modern penalty. It very largely superseded transportation during the 18th century. At first prison life was usually congregate and no work was provided. The physical conditions were very unsanitary and the moral atmosphere very corrupting. During the 19th century the physical conditions were much improved. Cellular confinement was introduced and in many prisons was made solitary. Hard labor was usually imposed. But even after these changes were effected, prison life was far from beneficial for the inmates on account of its rigid and artificial character. During the latter half of the 19th century the idea of reformation became prevalent in prison reform and resulted in the construction of reformatories and reform schools for the younger criminals in which these criminals could be educated and trained as well as punished. This idea is being extended more and more to other classes of criminals and is pervading the management of prisons in general. The ideal of penal treatment now is to develop a system of penal institutions in which a suitable place will be provided for each type of criminal. Such a system will include reception and observation prisons, reformatories, industrial and farm colonies, asylums and penitentiaries for incorrigibles. In this system the principle of the individualization of punishment would be applied, and the data and scientific principles of criminology would be fully utilized. Crime can never be entirely abolished, but it can be prevented to a certain extent. The program for the prevention of crime is included very largely in the program for the prevention of poverty and other social evils which give rise to crime. Criminology can aid greatly in the prevention of crime by revealing how these social evils give rise to crime.

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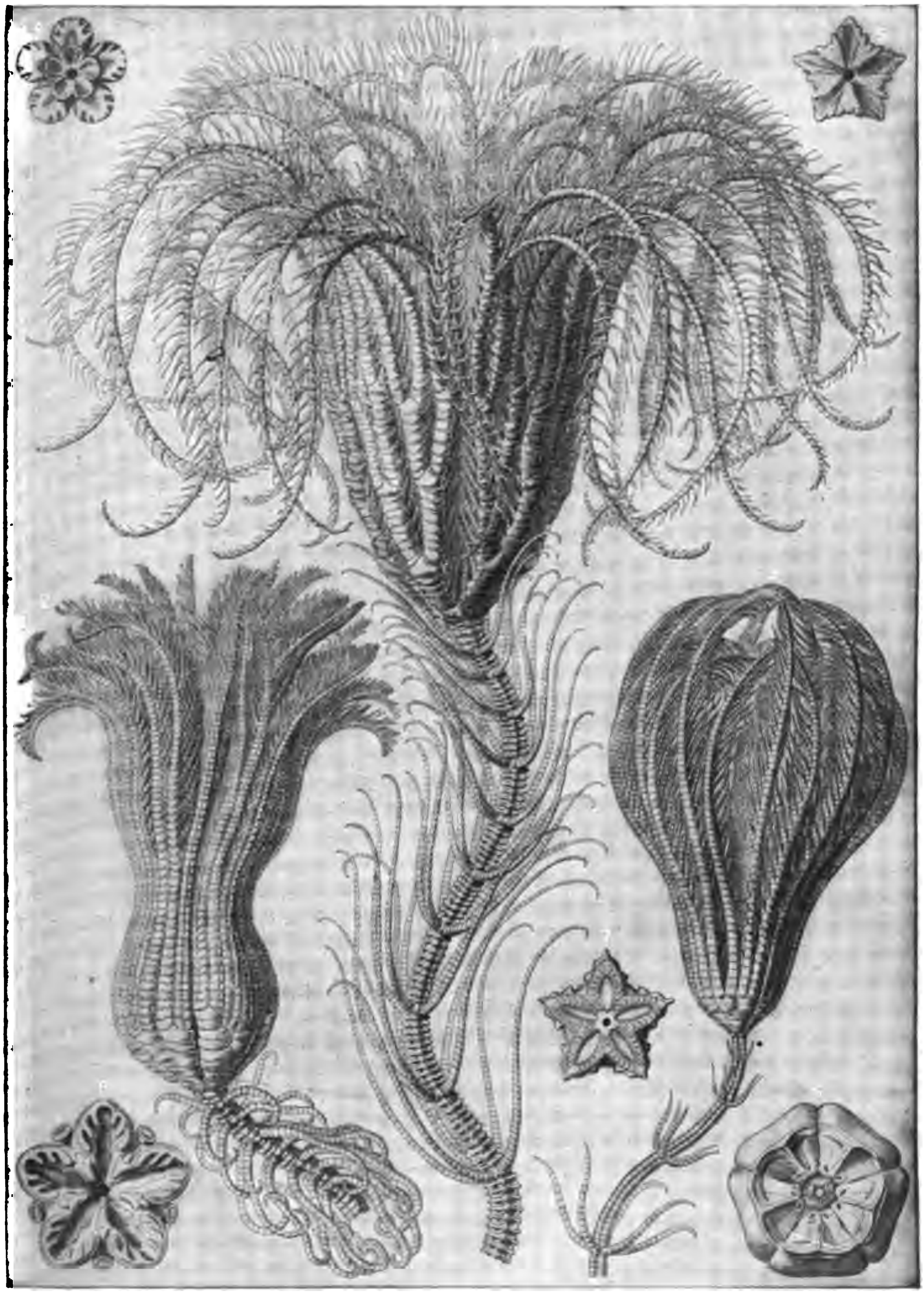
CRIMP, an agent who for a commission supplies ships with seamen, the term being applied especially to low characters who decoy sailors by treating them, advancing money to them, and giving them goods on credit, till they have them in their power, frequently getting them shipped off in a drunken state after all their money is spent. They also keep an outlook for emigrants, and take them to low lodging-houses, in which they themselves are interested. There are laws protecting seamen from the extortion of crimps and their dealings with masters of vessels, but these are unable to reach a very large proportion of cases.

CRINOID, krī'noid, or **SEA-LILY**, a stalked echinoderm usually fixed to the sea bottom by a jointed stem so as to present a flower-like form. The body is more or less cup-shaped, with 5 to 40 jointed flexible arms subdivided into branches, and bearing pinnules, all made up of minute bony plates, which in some of the larger fossil species numbered over 150,000. The arms may be absent in the blastoids (*Pentremites*) and certain cystideans, but the pinnules remain. There are not now many existing species, the greater number (nearly 1,000) having become extinct. A typical crinoid is *Pentacrinus*, which lives attached to rocks in the West Indies at all depths from 20 to 3,000 fathoms; it is about a foot high, the arms much subdivided, the joints of the stem five-sided. In one fossil species the stalk was more than 50 feet long. In geologic times crinoids often grew in dense forest-like masses. A curious little living crinoid is a slender simple form about two inches high, which lives at the depth of from 100 to 1,000 fathoms on the coast of Norway and in the Straits of Florida in the cold water under the tepid Gulf Stream. It is a survivor of a genus of the Cretaceous Period. A north Atlantic shoal-water form is the *Antedon* (*Comatula*), which in its early youth is fixed to the bottom by a stalk, but which becomes free when mature; it also inhabits the Mediterranean Sea. The existing crinoids, more than 200 species, are merely the remnants from a much larger assemblage of fossil forms, which begin to appear in the rocks of the Cambrian, culminate in the early Palæozoic and decline toward the end of that period. At first small and delicate, they became larger and coarser in the later rocks. They flourished in greatest numbers about palæozoic coral reefs in shallower water than at present. The most famous American fossil crinoid beds are those of the Subcarboniferous limestones of Burlington, Iowa and Crawfordsville, Ind. Thick beds of crinoidal limestones were deposited in various parts of the world at various periods and under favorable conditions from the Ordovician to the Jurassic Period, those of the Carboniferous and of the upper Muschelkalk, the lower beds forming the so-called Trochitenkalk, being especially characteristic, and consisting almost wholly of stems of *Encrinus liliformis*, the «stone lily.» Crinoids are divided into three classes. The oldest, most generalized and primitive appears to be the class *Cystoidea*. These were more or less spherical in form, either with imperfectly developed arms, or without, and stalked or not. About 250 species are known. They date from the Cambrian Period, culminated in the Ordovician and Silurian Periods, then suddenly diminished in numbers, finally disappearing before the close of the Permian. The second class is the *Blastoidea*, or bud-shaped crinoids, represented by *Pentremites*, which were short-stemmed or entirely stemless. The arms are short, recumbent and appear as if soldered to the calyx or body. These have not yet been detected in strata lower than the Silurian and the type became most numerous in the Subcarboniferous limestones of the United States. Upward of 120 species have been recognized. The third class is *Crinoidea* proper. The three classes are arranged under the sub-branch, *Pelmatozoa*. New species are constantly being found, notably in the waters of the Philippines, Africa and the Hawaiian Islands, and a few along the Atlantic Coast of the United States. Consult Clark, A. H., 'A Monograph of Existing Crinoids' (United States National Museum Bulletin 82, Washington 1915); Proceedings of the United States National Museum, Vols. 34 onward: Zittel, K. A. von (Eastman's trans.), 'Text-book of Palæontology' (London 1900–02).

CRINOLINE (Fr., from Lat. *crinis*, hair), properly a kind of fabric made chiefly of horse hair, but generally applied to a kind of petticoat supported by steel hoops, and intended to distend or give a certain set to the skirt of a lady's dress. Hooped skirts are by no means a new invention of fashion, a somewhat similar monstrosity, supported by whalebone, being worn in the time of Queen Elizabeth and James I, and the fashion being again introduced in the time of George II. The earlier hooped petticoats were called fardingales or farthingales. The crinoline proper came in about 1856, and was worn by women of all ranks, and sometimes reached portentous dimensions, so as to be not only very inconvenient to the wearer and all coming in contact with her, but also the cause of accidents from fire, etc. The immense bell-shaped crinolines fell into disuse about 1866. Crinoline wire was for years a leading branch in the steel trade. A horse-hair and cotton fabric used as a material for making ladies' bonnets is also called crinoline.

CRINUM, krī'nŭm, a genus of bulbous-rooted herbs of the family *Amaryllidaceæ*. The numerous and widely distributed species are characterized by rather broad, usually persistent leaves, and umbels of few to many funnel-shaped flowers, often deliciously fragrant. The flowers are usually pure white, with bands of purple or red, or tinted throughout with one of these colors. Several species are widely popular as greenhouse specimens and in the warm South and California as outdoor subjects on lawns. *C. americanum*, the Florida swamp lily, is common in wet ground in the Gulf States. *C. longifolium* and *C. moorei* are somewhat hardy, the former as far north as Washington, the latter not quite so far. Both these species blossom continuously through the summer; the others generally have a short season of bloom. More than 20 species with many horticultural

CRINOIDS



1 Metacrinus angulatus
2 Pentacrinus Maclearanus
3 Pentacrinus Wyville-Thompsonii

4, 5, 6 Sections of No. 3 showing formation of structure
7, 8 Sections of No. 2 showing formation of structure

varieties are cultivated in American gardens and greenhouses. They differ widely in their demands as to cultivation, for an account of which, and also for a description of the popular species, consult Bailey, 'Cyclopedia of American Horticulture' (1914).

CRIPPLE CREEK, Colo., city and county-seat of Teller County, on the Florence and Cripple Creek and the Midland Terminal railroads, 50 miles west of Colorado Springs. It is the trade centre for the Cripple Creek mining district, in which the output of gold from 1890 to 1916 was $301,000,000. The town has several cyanide mills, smelters and other mining industries, a national bank and daily and weekly newspapers. It was founded in 1890, and was nearly destroyed by fire in 1896. Several great labor strikes have taken place here. The Roosevelt Drainage tunnel opened in 1910 has greatly increased mine values by unwatering the field which covers an area of nearly six miles, one-tenth of which alone has been developed. Pop. 6,206.

CRIPPLED CHILDREN. See CHILDREN, DEFECTIVE.

CRISES, Economic. Crises are periods of financial or commercial and industrial depression or disturbance, distinguished by sudden and general efforts to liquidate, by scaling down of prices, by restriction of credit and by widespread failures, insolvencies and bankruptcies. The words crisis and panic are used interchangeably, though the former is the more nearly correct term denominating the period during which industry changes from a state of prosperity to one of depression. The word panic more fittingly describes a briefer period, or an acute phase not always appearing in crises, during which the morale and judgment of the business community are seriously upset by fear of impending trouble. Lord Overstone has described the sequence of phenomena known as a "business cycle" as follows: "State of quiescence, improvement, growing confidence, prosperity, excitement, overtrading, convulsions, pressure, stagnation, distress, ending again in quiescence." The period of expansion of business, accompanied by increased activity in production and commerce, known as "good times," is followed by a period during which, owing to rapidly advancing prices of materials and labor, some enterprises find their profits considerably reduced. Accordingly they contract their operations, dispense with a portion of their workmen, restrict their purchases of raw materials and thus affect adversely the industries supplying the materials and encroach upon the ability of the workmen to continue their former scale of living. There is a consequent decline in the demand for general commodities and the curtailment extends in ever-widening circles until the whole business system is affected. One or two failures may force other houses to suspend and general disaster follows, panic rules and total collapse seems imminent. The recovery is slow, a period of stagnation or depression follows, during which business is at its lowest ebb, and before confidence is completely restored, considerable time has elapsed. Business then begins to improve and expand, prices begin to soar, activity increases, and another period of prosperity is at hand, good times prevailing until again checked by a new crisis. A depression of business need not constitute a crisis but may be only a period during which business and commercial activities are below the normal standards; a depression may exist independently, but usually follows a crisis.

Many reasons have been advanced for crises but the actuating causes are never twice alike, one crisis being caused by the failure of some great firm or firms, another by war, another by monetary legislation, another by stock market speculation, another by bad harvests, another by over-expansion of world commerce, another by a change of a nation's political policies, which may cause investors to become timid and reluctant to loan their capital to enterprises that may not receive the protection through national economic policies considered necessary and adequate to their stability and success. A century or two ago local distress might have been caused by crop failures or some other calamities, and panic might have been induced by such wild-cat adventures as the South Sea and the Mississippi Bubbles (qq.v. See also LAW, JOHN), but these events had not the far-reaching effects characterizing modern industrial disturbances and, therefore, we may say that crises are practically 19th century phenomena. Some assert that capital forms more rapidly than fields wherein to invest it safely and profitably and as profits decrease capitalists are liable to make investments of an unusual or hazardous nature, resulting in the total loss or destruction of capital and the consequent general alarm and crisis. A theory advanced by Ricardo and elaborated by Rodbertus is the "iron law of wages," under which the laborer does not receive all he produces either in the commodity produced, in a commodity of corresponding value which he may need, or in an equivalent wage, but receives a sum so small as to place him under the necessity of continuing his work of reproduction in order that he may not starve, thereby maintaining the supply of labor. The capitalist takes the difference between the laborer's wages and the selling price of the commodity and, being unable to spend the total amount and anxious to increase his power or the earning capacity of his surplus wealth, converts it into capital through investment. Thus capital increases more rapidly than the laborer's ability to purchase, resulting in a so-called over-production, though the Socialists insist that this actually is an under-consumption. Ultimately this results in an industrial disaster.

Much space is devoted by economists to the subject of credit and its abuses as a cause of crises. The extensive obligations contracted during normal times to conduct business enterprises are based largely on physical assets and partly on the faith of the lender in the ability, character and integrity of the borrower. Such obligations are usually of indefinite maturity, though the loans are mostly for a short time only, and the borrower may be called upon to liquidate his indebtedness quickly. Good times may mean easy money and the unwary capitalist may loan his money to inexperienced, incapable, oversanguine or speculative investors. One of the results of easy money is the tendency of those in charge of business enterprises, on obtaining a loan, to divert the funds to other than immediate actual requirements. During periods of depression production is curtailed and often discontinued entirely, wherefore stocks of goods become depleted. On the return of confidence and the renewal of activity, through the resumption of buying by the public, the manufacturing plants experience difficulty in filling orders and their owners or managers therefore borrow money or cut down their working capital to remodel and extend their plants or to purchase extra equipment or for some other form of fixed asset. Often large sums are invested merely in anticipation of future increase in demand and production, mills and railroads being excellent examples of such preparations for future prosperity. Usually this work is carried too far; the means of production outstrip the demand for goods; the ratio between current assets and liabilities is reduced; and such enterprises, with impaired working capital, are liable to insolvency when trade depression sets in. In order to prevent the disruption of industry through the over-extension of credit there must be some means to safeguard the granting of short time or indefinite credits and an emergency currency that will allow a large portion of these loans to be liquidated safely within the brief period of a panic. The usual safeguards are the credit reports of the mercantile associations, the registry of commercial paper and the demand for audits by certified public accountants. The facilities for quick liquidation have been extended by the Federal Reserve system of banks. See CREDIT; CURRENCY; BANKS AND BANKING — FEDERAL RESERVE SYSTEM.

Crises have been confined practically to western Europe and to the more advanced American countries. In the United States the most notable crises have been those of 1819, 1837, 1854, 1857, 1873, 1884, 1893 and 1907. These were nearly coincident with crises occurring in England, and the crises of 1836–39, 1857 and 1873 may be called international in extent. Prior to and during the War of 1812 there had been much wild-cat banking and the country was launched on a paper money era, the banks being unable to secure specie sufficient to redeem even a small portion of their paper. In 1814 Congress refused a charter to a proposed national bank and people began to lose faith in banks and to withdraw their money. Banks in the South ceased to redeem their notes and on 28 Aug. 1814 the Philadelphia banks suspended specie payments, followed by others in the North and in Ohio, until every bank in the seaboard States had taken similar action. But by threats and legislation the State and Federal governments compelled these banks to resume specie payments which the majority had done by the latter part of 1817. Meanwhile in 1816 Congress had established a bank of the United States to regulate the currency. On the conclusion of the war foreign trade began to revive which required vast sums of money; in 1814, while the blockade was in force, the imports were valued at $12,965,000 and exports at $6,927,441, but in 1815 these figures had risen to $113,041,274 and $52,557,753 respectively and in 1816 to $147,103,000 and $81,920,452. Furthermore, during the blockade, when commerce was practically at a standstill, the merchants transferred their capital to manufacturing establishments and when the lifting of the blockade resulted in a vast influx of foreign made goods, protection was demanded for the industries, resulting in the enactment of a protective tariff in 1816 (amended in 1818). Meanwhile in 1815 a commercial convention had been concluded with Great Britain, under the terms of which each country was to regulate, as it saw fit, its trade with British North American and West Indian possessions. In retaliation for a supposed discrimination against them in American regulations, the merchants of Nova Scotia and New Brunswick secured the passage of the "Plaster of Paris" Act which prevented the transportation of this article in American vessels to the place of consumption. Great Britain then excluded American ships from the West Indies and as these acts rendered idle 100,000 tons of American shipping, the shipping interests were prostrate, all allied trades languished, and thousands of mechanics were thrown out of work. In 1811 steamboats had been introduced on Western waters and capital and enterprise turned to the task of opening the West. Owing to the ease with which people could secure paper money from the wild-cat banks, there was widespread speculation in lands, the record of public land sales being 270,000 acres in 1813, 1,120,000 in 1815, 2,160,000 in 1817, 5,470,000 in 1819 and 820,000 in 1820. Everyone hastened to plunge into debt, expecting to become rich thereby, but when the banks began to contract their discounts and currency began to be reduced, the debtors were unable to meet their obligations and general bankruptcy followed with its attendant hardships in all circles. There was a general depression in business. Many blamed the tariff but the greatest outcry was against the banks, both State and National, and accordingly there was a wave of anti-banking excitement throughout the country. But this soon subsided, the States enacted stay laws, prohibited imprisonment for debts less than certain amounts, passed acts against usury, and conditions became about normal in 1821.

In 1832 President Jackson became convinced that the Bank of the United States was using its funds insidiously and ordered the government funds deposited therein to be withdrawn. Since $9,891,767 in public money was on deposit, the bank was compelled to curtail its loans and could not use any of the public deposits for the benefit of the commercial community. As a result money became scarce, discounts rose rapidly and in 1833 many business houses failed. Jackson's quarrel with the bank resulted, in 1834, in its failure to secure a renewal of its charter, and its career as a national institution was practically ended. Almost simultaneously the national debt was paid off and the treasury began to have a surplus, wherefore a bill was passed in 1836 providing that all but $5,000,000 of the money in the treasury on 1 Jan. 1837 should be deposited with the several States in proportion to their representation in Congress, and in order to safeguard the deposits the Secretary of the Treasury was to select the State banks for depositories. The effect of this distribution of surplus revenue among the States was the formation of new banks with nominal capital and the flooding of the country with paper money. In 1837 there were more than 600 such banks with an aggregate capital of $291,000,000, of which $149,000,000 was in circulating notes and $127,000,000 in deposits, while their total loans and discounts amounted to

$525,000,000. Wild speculation occurred, especially in land, millions of acres being bought and held for a rise. Prior to 1834 the annual sales of land never exceeded $4,000,000 but in 1834 the receipts were $4,887,000, in 1835, $14,757,000 and in 1836, $24,800,000. But this consisted not of specie but only of credit on the books of the banks that held government deposits. Early in 1837 the banks began to call their loans, to curtail their accommodations and to increase rates of interest. Owing to the crisis in England specie ceased to be imported, whereupon the price of money rose. To make matters worse the wheat crops of the eastern States had been seriously damaged by a scourge of the Hessian fly, wherefore the price of wheat and flour rose rapidly, until early in 1837 wheat brought $2.25 per bushel and flour $12.50 per barrel, which caused several flour riots. Furthermore an abnormally large cotton crop the previous year was accompanied by a proportionate slump in prices and a consequent depreciation in the credit of those connected with the cotton industry. Soon three great cotton firms in New Orleans failed with liabilities of $2,500,000, to be followed immediately by three New York firms with liabilities of $9,000,000. By the first week in April the failures in New York numbered 98 with liabilities of over $60,000,000 and two weeks later they numbered 168. Real estate, and railroad, canal and other stocks depreciated in value and thousands of workmen were deprived of employment. Prior to this time President Jackson had caused the «Specie Circular» to be issued, requiring all public land agents to accept nothing but specie in payment. This compelled the banks to redeem in specie practically their entire circulation, and as the contingency caught them unprepared, on 9 May 1837 they suspended specie payments and not until two years had passed did the last of the banks resume. Before that, however, Congress had enacted a bankruptcy law and the States had passed statutes of limitations and similar measures, so that some order began to appear out of the chaos. The most important result of the suspension was the establishment of the independent treasury system in 1840. Moreover, from 1837 to 1842 the number of banks of the country was reduced by nearly 100, circulation and deposits were cut in two, and the banks in general exercised more caution.

In 1854 came a stringency in the money market and hard times began to press upon the country. Trade was more sluggish than at any time since 1837. Money was hard to obtain and the very best paper sold at 10 and 12 per cent, some going as high as 1½ per cent per month. The export of specie from the country was large. These conditions brought on a panic in Wall street in September 1854 which was followed in November by financial disasters in the West and South and the suspension of many banks and bankers. This monetary panic and the subsequent depression were only a precursor of the panic of 1857. After a few minor failures the Ohio Life Insurance and Trust Company of Cincinnati failed on 24 Aug. 1857 with liabilities of over $7,000,000. This created a panic in Wall street and many brokers and bankers were unable to meet their obligations. On 25 September the Bank of Pennsylvania at Philadelphia suspended payments, to be followed soon by banks in almost every section of the country. Early in October the Illinois Central Railroad made an assignment, the New York and Erie Railroad Company protested its notes and the Michigan Central suspended payment on its floating debt. The prices of commodities rapidly declined, factories and workshops suspended and thousand lacked employment. Armies of workingmen, desperate in their fear of starvation and poverty, paraded the streets of cities, rioting occurred in many places, and the militia was called upon to restore order. In 1857 there were in the United States and British provinces 6,022 failures, with liabilities of $282,335,000, and during the first three months of 1858 there were 1,540 failures, with liabilities of $31,733,000. The causes of the panic have been attributed to various circumstances, such as the reduction of the tariff, the speculation engendered by the influx of gold from California (which caused the belief to prevail that no undertaking was too stupendous for the fortunate nation to undertake), the enormous extension of railway lines, the expansion of bank loans and circulation, the export of specie, the increased importations of merchandise, and undue extension of credit. During 1858 the depression continued unabated but at the opening of 1859 good times seemed to have returned. The South was prosperous, general crops were bounteous and prices were high, but in June 1859 a killing frost laid low the crops of wheat, grain, potatoes, vegetables and fruit in New York, Pennsylvania, Ohio, Indiana and Illinois. Nevertheless by 1860 another season of prosperity seemed at hand, only to be stifled by the Civil War.

In the spring of 1873 occurred a sharp reversal of previously prosperous business conditions. In anticipation of profits, a speculative spirit had been aroused which produced an overproduction in every branch of industry, a general glut of the market and a ruinous decline in prices. Money gradually became tight, discount rates advanced rapidly, and by September little money could be borrowed at any price. After the downfall of a few smaller concerns, the panic broke forth on 18 September when Jay Cooke & Co., of Philadelphia, suspended, as a result of which stocks slumped on the exchanges and a score of brokerage houses, banks and banking firms were forced to the wall. Suspension of payments occurred first at New York but extended to all the larger cities and continued until 1 November. The panic in the «Street» was of short duration but its effects were apparent in commercial and industrial circles for months, thousands of establishments being handicapped or completely prostrated by the lack of available funds to conduct their business. Between 1873 and 1876 the mercantile failures were $775,000,000 and the defaults by railways up to 1 Jan. 1879 amounted to nearly $800,000,000. The number of bankruptcies up to 1878 was 10,478, while the depression following the panic was even more fatal to productive industries. Between 1873 and 1879 these failures numbered 47,000 and the money loss was $1,200,000,000. It is estimated that 3,000,000 men were thrown out of work. The depression extended to many parts of the world.

In 1883–84 another period of panic and depression began. The gigantic speculation in railroads reached its zenith about 1880 and a retrograde movement set in. President A. T.

Hadley in his 'Railroad Transportation,' says that of the 29,000 miles of road constructed in 1880-82 only a third was justified by existing business, another third might be profitable some time in the future, and of the remainder some were built to put money into the hands of the builders as distinct from the owners, some were built to increase the power of existing systems, where they were not needed, and some were built to sell as a blackmailing scheme against other roads. During 1883 there were a few small commercial failures and on 1 Jan. 1884 the New York and New England Railroad went into the hands of a receiver. During 1884 and 1885, 41 railway corporations, holding 19,000 miles of track, were placed under receivership and 37 smaller railroad properties were sold under foreclosure. Moreover in the spring of 1884 a decline in the prices of agricultural products occurred. Owing to a great increase in the world's wheat crops, the price fell below that of 1878, resulting in stagnation of interior trade, because farmers held their produce for more favorable market conditions. Hence railway freight traffic was greatly diminished, thereby reducing railway stock dividends, and consequently investors hesitated to embark in railroad enterprises of great magnitude. In May 1884 came the failure of the National Marine Bank of New York, the president of which was associated with the firm of Grant and Ward, which failed shortly afterward with liabilities of $17,000,000. Several other banks and banking houses failed, the total liabilities of the wrecked concerns being about $240,000,000. While the panic centred in New York, there were numerous failures in other cities, 11 national banks and about 130 other banks and private bankers being counted in the list. There was no suspension of specie payment during the panic and this, together with bounteous crops, tended to improve conditions, the general distrust diminished, credit circulation was re-established and the discount rates resumed their normal level.

For some time prior to 1894 the foreign financial situation had been much upset and in 1890 the firm of Baring Brothers of London failed with home liabilities of over $100,000,000. Consequently English holders of American securities dumped them into our market and gold began to flow toward London; this export of gold was further enhanced by high rates of exchange in foreign financial centres and heavy imports of merchandise in 1891. Early in 1892 conditions changed and owing to our enormous exports of wheat a considerable portion of the gold returned, thus restoring our depleted gold reserve. But for various causes the price of wheat suffered a serious decline, English investors became alarmed at the condition of the United States treasury and currency, and, fearing that we might enact a free coinage silver law, again sold their American securities with the result that, owing to exports of gold, the reserve had fallen to $114,231,883 in May 1892 and was likely to fall below the legal limit of $100,000,000. The Secretary of the Treasury then discontinued the payment of debts in gold and began to hoard it, and the year passed without much further financial trouble. But prices and cost of living had been advancing without any compensatory increase in wages. The workingmen were in a relatively worse condition than before and struck for higher wages, several disastrous clashes occurring in 1892, especially at Homestead, Pa., in the Cœur d'Alene mining region of Idaho and in the Erie and Lehigh Valley Railroad Yards at Buffalo. In November 1892 Cleveland was elected President on a platform calling for a parity between gold and silver coins, and creditors feared that the government either could not or would not redeem its legal tender notes in gold coin, there being only $100,982,410 in the gold reserve when Cleveland assumed office, and barely $25,000,000 in other forms of money. Hence, according to Lauck, the widespread apprehension as to the fixity of the gold standard of payments, together with general industrial unrest, caused the panic of 1893. On 20 Feb. 1893, before Cleveland assumed office, the Philadelphia and Reading Railway, with $40,000,000 capital and $125,000,000 debt, went into bankruptcy; on 5 May came the failure of the National Cordage Company with $20,000,000 capital and $10,000,000 liabilities, these failures causing a heavy slump in the stock market. On 26 June the government of British India suspended the free coinage of silver and the price of silver dropped in three days from 82 to 67 cents per ounce. In July the Erie Railroad failed and the Milwaukee Bank suspended, causing runs on banks, particularly in New York. In August the House of Representatives voted to repeal the Sherman Silver Purchase Law, but though this helped to restore confidence, the Senate failed to act until 30 October (Cleveland signing the bill 1 November), when it was too late to stem the tide of disaster. In December 1893 the Comptroller of the Currency announced the failure during the year of 158 national banks, 172 State banks, 177 private banks, 47 savings banks, 13 loan and trust companies and 6 mortgage companies, though a few of these afterward resumed business. In 1894 156 railway companies, operating nearly 39,000 miles of track, were in the hands of receivers, the total capitalization of these companies being about $2,500,000,000, or one-fourth the railway capitalization of the country. Commercial failures increased from 10,344 in 1892, with liabilities of $114,000,000, to 15,242 in 1893, with liabilities of $346,000,000. The problem of the unemployed became acute and relief committees were organized in many cities; numerous demonstrations by the unemployed occurred, the most spectacular being the march to Washington in April 1894 of the "industrial army" under J. S. Coxey to demand help from the government. In the same month 130,000 miners stopped work, followed later by 25,000 more; in June to July occurred the Pullman boycott in Chicago; other strikes took place at New Bedford, Fall River and New York; and in January 1895 the employees of the Brooklyn Electric Railway system went on strike. Agricultural disaster also overtook the country in 1894, a drought ruining the corn crops of Iowa, Kansas and Nebraska, reducing the yield to one-fourth that of 1893. The wheat crops were larger, but so were European wheat crops, and as there was no market either abroad or at home the price of wheat declined to its lowest mark, 49 cents per bushel, and similar declines were experienced in the prices of corn, oats, rye and barley. In August 1894 the Gorman-Wilson Tariff Bill became law, the treasury reserve was kept intact during the next two years by the sale of gold bonds, and the public began to regain its confidence in the government and the stability of business institutions, which was further enhanced by the election of McKinley in 1896 on a protective platform and by the enactment of the Dingley tariff in 1897.

The crisis of 1907 has been called a «rich man's panic» and the «panic of undigested securities.» Under the fostering protection of the high tariffs came the organization of numerous consolidated corporations known as trusts, of which, according to one authority, 225 sprang into existence during 1899 to 1903. An era of prosperity set in but in 1906 the life insurance scandals and the subsequent investigations and legislation tended to throw discredit on some of the business methods in vogue. In spite of these revelations, the year 1906 was the most prosperous the country had known, crops being abundant, wages high, iron and steel production enormous, freight business beyond capacity, dividends earned on non-paying stocks and money plentiful for promoting any kind of speculative enterprise. By the end of the year, however, affairs began to take a downward turn, due in part to the Lawson articles, in part to the prosecution of corporate interests by the Federal government under Roosevelt, in part to instability of the banking and currency system, in part to over-speculation and over-expansion of business enterprises and various other causes, resulting in March 1907 in a general unloading of speculative securities. Values continued to decline, producing a temporary stringency in August 1907, which was followed by the financial crisis of October, when several banking institutions of New York and Brooklyn suspended, to be followed by others in various sections of the country. In spite of the inability of business men to obtain adequate financial accommodations, the number of failures was surprisingly small. The government aided the banks by depositing money, the clearing houses issued certificates, the importations of gold increased and confidence slowly returned, the normal level being reached again late in 1908, though the effects were apparent for a much longer time, even as late as 1912–13.

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IRVING E. RINES.

CRISFIELD, Md., city in Somerset County, 100 miles southeast of Baltimore, on the New York, Philadelphia and Norfolk Railroad, on Chesapeake Bay. It was incorporated in 1910. It has a marine hospital. Oyster and crab-fishing are chief industries. There is steamship communication with Baltimore. Pop. 3,468.

CRISIS, in medicine the turning-point in a disease at which a decided change for the better or the worse takes place. In regular fevers the crisis takes place in certain days, which are called critical days (the 7th, 14th and 21st); sometimes, however, a little sooner or later, according to the climate and the constitution of the patient. The word crisis is also figuratively used for a decisive point in any important affair or business, for instance, in politics and commerce. See CRISES, ECONOMIC.

CRISIS, The, the general name given to a series of political articles by Thomas Paine. These are 13 in number, exclusive of a Crisis Extraordinary› and a ‹Supernumerary Crisis.› The first and most famous, published in the ‹Pennsylvania Journal,› 19 Dec. 1776, began with the famous sentence, «These are the times that try men's souls.» «It was written during the retreat of Washington across the Delaware, and by order of the commander was read to groups of his dispirited and suffering soldiers. Its opening sentence was adopted as the watchword of the movement on Trenton, a few days after its publication, and is believed to have inspired much of the courage which won that victory.» The 13th, published 19 April 1783, bears the title, ‹Thoughts on the Peace, and the Probable Advantages thereof.› It opens with the words, «The times that tried men's souls are over.» The pamphlets throughout exhibit political acumen and the common-sense for which Paine was remarkable. As historical evidence of the underlying forces in a unique struggle, and as a monument to patriotism, they possess great and lasting value.

CRISP, Charles Frederick, American jurist: b. Sheffield, England, 24 Jan. 1845; d. Atlanta, Ga., 23 Oct. 1896. He came to the United States when a child; served in the Confederate army 1861–64; was admitted to the bar in 1866; was solicitor-general of Georgia from 1872 to 1877; and judge of the Supreme Court 1877–82. He resigned the last office to accept a nomination for Congress, of which body he was a member until his death. From 1891 until 1895 he was speaker of the House.

CRISPI, Francesco, Italian statesman: b. Ribera, Sicily, 4 Oct. 1819; d. 11 Aug. 1901. He studied law at the University of Palermo, taking the degree of doctor of laws at the age of 18 and settled at Naples in 1846. He took part in the Sicilian revolution at Palermo (1848), but when the Bourbon government was reinstated he fled to Piedmont, where he engaged in journalism for various radical papers and in private studies. He must have been in bad financial straits, for he actually condescended to apply for the wretched position of communal secretary to Verolengo, a small village of Piedmont, which he was denied. He was offered a position in journalistic work on a journal supported by Cavour, but his adverse principles made him refuse the post. In 1853 he became implicated in Mazzini's attempt to raise an insurrection in Lombardy and he was consequently exiled. He thereupon went to Malta and thence to France and London, where he made the personal acquaintance of Mazzini, to whom he became devoted. Both conspired for the freedom of Sicily. After the war of 1859 Crispi returned to Italy, set moving his plans for insurrection and in 1860 assisted Garibaldi in the expedition of the Thousand for the deliverance of the two Sicilies. Palermo fell, and Crispi was at once made Minister of Interior and Finance in the provisional government. Italy's immediate annexation of the Sicilies caused Crispi to resign. He was sent to the Italian Parliament as first representative from Palermo, where he immediately made himself conspicuous, first as the leader of the radical Left and then as an exponent of monarchical constitutionalism. It was at this time that he wrote to Mazzini his article of faith: «The monarchy unites us; the republic would divide us.» In 1876 he became Minister of the Interior. In the following year he visited the European countries and came to know their leading representatives. In December 1877 he became Minister of the Interior in the Depretis Cabinet, and during this time assisted in securing the establishment of a unified monarchy under Humbert I of Italy. He was, however, denounced and removed from office on a charge of bigamy. His acquittal did not win public opinion to his favor, and it was not until 1887 that he resumed his office. In July 1887 he became Premier and head of Foreign Affairs, on the death of Depretis. As an earnest supporter of the Triple Alliance, he became a friend of Bismarck. The pending Franco-Italian commercial treaty was broken off. His vigorous policy reformed the courts and secured the adoption of commercial and sanitary laws. But he was overthrown in February 1891, and the succeeding cabinet found him an effective opponent in the Chamber of Deputies. In 1893 he was recalled to office and immediately entered upon a resolute suppression of disorders, and reorganization of public financial administration on the lines suggested by Sonnino. The radical leader, Cavalotti, became his bitter opponent, resorting to all sorts of underhand methods of ruining the reputation of Crispi. Several attempts were made on his life; but popular favor retained him in office, until, on the defeat of the Italians in Abyssinia, he resigned, to be succeeded by the Rudini Cabinet, which was in sympathy with Cavalotti. Charges were brought against him for swindling public money, but the Chamber refused to prosecute on discovery that the ground for the accusation was the irregular handling of a sum for the use of secret service. Crispi's resignation from Parliament was soon annulled by his overwhelming re-election in 1898. His failing eyesight caused him to withdraw from politics temporarily, but with a successful operation, he again wrote articles in behalf of the Triple Alliance and remained an important public figure to the last. Crispi's greatness is no longer disputed. His splendid, vigorous persistence brought Italy to the point of taking its place among the Powers of Europe and gained for that country a trust and confidence which it had never before enjoyed. Consult Stillman, W. J., ‹Francesco Crispi› (London 1899); a translation of his memoirs by Agnetti (London 1912); Crispi, T. P., ‹Francesco Crispi› (Milan 1913).

CRISTOBAL, city of the Canal Zone, comprises that part of the city of Colon, Panama, lying within the boundaries of the Canal Zone and upon lands purchased in other transactions by the United States. Its government is entirely separate from that of Colon. The docks of the Panama Railroad line of steamers are located here, and here also are the offices of the resident engineer of the Atlantic Division of the canal and the headquarters of the Canal Commissary Department. The city is the site also of the great cold-storage plant of the Canal Commission and the shops of the Panama Railroad. The establishment at Cristobal in 1915 of a branch of the Commercial National Bank of Washington, D. C., marked an important advance in the commercial possibilities of both cities. The old De Lesseps mansions are on Cristobal Point, where also stands the statue of Columbus and the Indian Maiden, presented by the Empress Eugénie to the city at the time of the French occupancy. The new terminal docks of the canal, affording docking facilities for 20 10,000-ton vessels at once, are an extension of the Point. More than three-fourths of the former shipping trade of the old city of Colon has gone over to Cristobal.

CRITIAS, krĭt'ĭ-ạs, Greek orator: d. 404 B.C. He was a pupil both of Socrates and of Gorgias of Leontini. He was one of the 30 tyrants set over Athens by the Spartans. He applied himself with great success to the culture of eloquence, and Cicero cites him among the public speakers of that day. Banished from Athens for some cause that is not known, he retired to Thessaly, where he incited an insurrection among the Penestæ or serfs. Subsequently to this he visited Sparta and wrote a treatise on the laws and institutions of that republic. Returning to Athens with Lysander, 404 B.C., he was appointed one of the famous 30, his pride of birth and hatred of demagogues having pointed him out as a fit person for that office. After a cruel and oppressive use of the power thus conferred upon him, he fell in battle against Thrasybulus and his followers. Plato, who was a relation of his, has made him one of the interlocutors in his 'Timæus and Critias.' He wrote tragic and elegiac poetry, fragments of which are restored in Bergk, 'Poetæ lyrici Græci' (Vol. II, Leipzig 1900); and fragments of his historical work are preserved in Müller, 'Fragmenta Historicorum Græcorum' (Vol. II, Paris 1863–83).

CRITICAL ANGLE. See LIGHT.

CRITICAL POINT (or CRITICAL STATE), in physics a state or condition at which the physical properties of a given substance undergo some important and more or less hidden modification. The term is seldom applied to a state or condition at which an easily visible change (such as freezing) takes place, but is usually reserved, by common usage (though not of necessity nor by any formal agreement), for limiting conditions of a less obvious nature. For example, the temperature (ranging, for different samples of the metal, from 690° C. to 870° C.) at which iron ceases to be susceptible of magnetization, is called the «critical temperature» of iron with respect to magnetism. At or near this same temperature the iron also undergoes important changes in its thermal and electrical properties.

The term «critical point» is most familiarly applied to the state that a gas is in when any further rise in temperature would preclude the possibility of liquefying it by pressure alone. It was long known that reduction of temperature facilitates the liquefaction of a gas, but it was nevertheless believed that a sufficient pressure would effect the liquefaction at any temperature whatever. Dr. Thomas Andrews, in the Bakerian Lecture for 1869, entitled 'On the Continuity of the Gaseous and Liquid States of Matter' (see 'Philosophical Transactions' for 1869, Pt. II, p. 575), showed that this view is erroneous, and that there exists for every gas a definite temperature above which it is impossible to liquefy the gas by the application of pressure. The temperature so defined is called the «critical temperature»; and the vapor tension that a liquefied gas exerts at its critical temperature is called the «critical pressure» of the gas. Similarly, the volume occupied by a unit mass of a gas that is at its critical temperature and is subjected to its critical pressure is called the «critical volume» of the gas. The critical constants of the various gases and liquids have not yet been determined with as much precision as could be desired, though good values have been obtained in a number of cases. Generally speaking, the critical temperatures are best determined. The critical pressures come next in order of accuracy, but as the experimental determination of the critical volume of a gas is exceedingly difficult, few of the critical volumes are known with any approach to precision. The accompanying table gives some of the values of the critical constants of gases. The critical temperatures are given on the Centigrade scale, and the critical pressures in atmospheres.

CRITICAL TEMPERATURES AND PRESSURES.

SUBSTANCE	Critical temperature (Centigrade) Above	Critical pressure (atmos.)
Mercury	+1,000°	Unknown
Aniline	+425.6	52
Water	+365	200
Acetic acid	+321.6	57
Benzol	+288	48
Chloroform	+260	55
Carbon disulphide	+274	76
Methyl alcohol	+237	73
Ethyl alcohol	+237	64
Sulphur dioxide	+157	79
Chlorine	+140	93
Ammonia (NH_3)	+131	113
Cyanogen	+124	62
Sulphuretted hydrogen	+100.1	91
Hydrochloric acid gas	+51.5	90
Acetylene	+35.2	61
Carbon dioxide	+31.37	72.9
Methane	—88	52
Oxygen	—118.4	50.4
Argon	—119	51
Carbon monoxide	—140	35.7
Air	—140.5	39.1
Nitrogen	—146.2	34
Hydrogen	—241	14

One important and curious fact that follows from the existence of a critical point is that the gaseous and liquid states of a given substance may be regarded as continuous with each other, inasmuch as it is possible to cause a substance to pass from one of these states to the other by a continuous process, and without any abrupt change of condition such as is apparent when ordinary condensation takes place. For example, if we heat a cubic foot of carbon dioxide gas up to 50° C., we can then compress it all that we please without producing the least sign of liquefaction; because the critical temperature of this gas is 31° C., and hence liquefaction cannot be induced at any temperature higher than 31° C. Let us now compress it at this temperature until its pressure is (say) 150 atmospheres. It is still a gas, for the reason just given. Finally we cool the gas, still constantly maintaining its pressure at 150 atmospheres, until its temperature becomes 15° C. There can be no doubt that it has now become liquid, and in fact actual experiment proves this to be the case. If the temperature had been maintained at 15° C. throughout it would not have been possible to compress the gas into the liquid condition without a visible, discontinuous passage from the one state to the other; but by the process described above it is possible to convert the substance from the gaseous state into the liquid state in such a manner that the transition is imperceptible to the senses, and is not accompanied by any sudden change of density. (For further discussion of the theoretical principles involved in the consideration of the critical state, see MOLECULAR THEORY; THERMODY-

NAMICS). Consult also Maxwell, 'Theory of Heat'; Preston, 'Theory of Heat'; and modern books on thermodynamics.

A. D. RISTEEN.

CRITICISM, the expression of a judgment concerning any subject; specifically the formulating of opinions based upon certain principles, in matters of art, literature, philosophy, etc. Certain canons apply in a general way to all criticism, but each branch has its own particular methods and standards. In its narrow sense, the art of criticism is confined to the study of the beauties or defects of some particular work; in its broadest aspect it includes the establishment as well as the application of principles, for the determination of which it must be largely indebted to philosophy. Aristotle was the first writer to develop a philosophy of criticism, applying it to the study of rhetoric and poetry. In connection with the truth that poetry deals more with «universals» and history with «particulars,» he assigns a higher rank to the former and brings out a fundamental distinction pointing to the crucial test for any high performance in art or literature. A work cannot permanently contribute inspiration and enjoyment, without possessing those elements which arise from the essentially and universally human, as contrasted with individual or temporary, characteristics. The Augustan Age produced one critic that the world of letters could ill spare. To Horace the art of criticism owes much of permanent value and perennial charm. In the 3d century appeared Longinus, whose refreshing enthusiasm for the beauty of letters places him above the mechanical student of forms and rules. Cicero and Quintilian have recorded observations on style that have been of permanent service. The traditions of culture, forgotten or dormant during the Middle Ages, and revived by the leaders of the Italian renaissance and the humanists, for a long time produced little that was broad, fundamental or independent in criticism. In France, Boileau, Voltaire, Corneille, Diderot and others led the way; and Germany is indebted to Lessing for a remarkable impulse given to this province of intellectual effort. Goethe, Kant, Schiller and Schlegel and his brother continued the work. The critical method was effectively applied to history, philology and science. Without, however, dwelling upon the array of profound and brilliant scholarship displayed in these departments of criticism, but confining the outlook to the field of literature and art, there may be noted among French writers, Taine, Sainte-Beuve and more recently Brunetière; in England,— Pope, Sidney, Dryden, Coleridge, Hazlitt, Macaulay, Ruskin, Carlyle, Pater, Matthew Arnold and Saintsbury; and in America,— Emerson, Ripley, Child, Ticknor, Longfellow, Lowell, Curtis and Stedman. Modern conditions have opened wider paths to criticism. The Greek and Roman critics had only their own work to study. To-day we have the dramas, the epics, the novels of many nations and ages. The study of comparative literature, now possible, opens up opportunities for tracing those influences which affected the literatures of all Europe, and affords the student the chance of building up from varying yet interrelated sources a standard of criticism. The differences due to national character and individual genius will teach him the limitations of hard and fast formal rules, while his faith in the fundamental canons of great art can only be made firmer by such comparative study.

Criticism will be found of use as a method of judgment for the reader, rather than an inspiring guide to the past. It is thus a rational study of fitting construction and adequate expression. As the art of judgment concerning the fairest flowering of the human spirit, criticism has one of the highest judicial functions; as the art of interpretation, admitting individual intuition and inspiring teaching, it has a creative function of wide and lofty worth.

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CRITIQUE OF PURE REASON, The. Kant's 'Critique of Pure Reason' (Kritik der reinen Vernunft) has commanded the attention of professional philosophers to an extent attained by no other modern work. Though a clumsy, unintelligible and technical writer, Kant long stood at the centre of academical philosophy — a position which he still enjoys in Germany —and this Critique is the portal to his system.

In the background are certain moral and religious problems of God, Freedom and Immortality to which the 'Critique' is a destructive metaphysical prolegomenon. He is here examining into the possibilities of metaphysical knowledge by a criticism of the nature of knowledge in general and would show through this criticism that the ideas of a soul, an ordered universe and God can have no metaphysical foundation and are not subject to either metaphysical proof or refutation. Their place as objects of *belief* and their development as moral postulates were accordingly made secure. The objects of these ideas of soul, cosmos and God are not given us in experience; and the proof of their existence, if it is to be found, must be by way of some knowledge transcending experience; so his quest is to find how knowledge a priori is possible.

Kant introduced what he called the Copernican revolution in philosophy. Philosophy had conceived the mind as that which is *impressed* with the form of objects and the order of nature. Kant reversed the point of view, making the mind *supply* form to its perceptions and structure to its universe. His peculiar contribution to epistemology lies in this recognition of the mind as active in experience.

All knowledge begins with experience, but the mind only knows what it can produce according to its own ideas; so that, although the object is the occasion for the experience, the mind must reproduce this in knowledge and supply the form which it here takes. Experience, considered from the point of view of the object, is a chaos of particulars. In so far as it has unity this must be supplied by the mind. As a compound, experience can never give universality and necessity. If we find universality and necessity in knowledge, it must come a priori.

There are three stages in knowledge: perception, judgment and reason. We get experience through sense perception; we think these various perceptions under conceptions, that is, make judgments about them, and finally we tie all our experience together under the «ideas» of a simple soul, an ordered and absolute universe and a first cause.

The mind *perceives* the manifold of sense under the *forms* of time and space. These are known through a priori intuitions for of them we may have universal and necessary propositions, such as those of geometry, which could not be arrived at through a summation of particulars. They supply unity to the internal and external sense respectively. Space and time have accordingly «transcendental ideality,» i.e., considered as to their origin in the act of knowing, they are ideal, being supplied by the mind.

The *matter* of perception is the sensation without form. The object, *as perceived,* is a phenomenon, but behind the phenomenon is something occasioning its being perceived. Although this *thing in itself,* or «noumenon,» must remain unknown to us, for our minds cannot reproduce it except according to their own conditions, it is not to be looked on as a mere dialectical by-product, for Kant needed the conception of noumenon in his moral philosophy.

The second part of the 'Critique' takes up the question of the synthesis of the understanding. The act of judgment, *A is B,* is a synthesis. *B* may be thought of as a part of, a cause of, or a quality of *A,* etc. These various relations in which experience is thought, such as whole and part, cause and effect, substance and attribute, are the «categories» or forms of synthesis of the understanding. Kant deduced them from the classification of propositions given in formal logic. Their significance lies in the conception which they give of knowledge as a structure, constituted by the mind, and not an accumulation, as, for example, the general conception of universal causal relation among phenomena, is a result of the mind imposing its own law of unity on the manifold, and thus constituting an organized world. The application of these laws of the understanding, however, is only to the world of phenomena beyond which their reign does not extend.

Reason cannot remain satisfied with the manifold given by the understanding in thought and must think this under absolute and unconditioned forms which it supplies in the «ideas»: «the unity of the thinking subject»; «the absolute unity of the series of the conditions of phenomena»; «the absolute unity of the condition of all objects of thought in general,» or, in other words, the simple soul, the cosmos and God. The objects of these ideas of pure reason cannot be presented in possible experience and we can only possess a «problematical conception» of them. We are led to these ideas by a «necessary procedure of reason,» but the attempts of the orthodox metaphysics to establish their objective reality are shown to be illogical and contradictory, thought here running out into certain antinomies. These ideas express the utmost possibility of synthesis, the vanishing points in the perspective of human experience. As such they are of use in experience, but not for gaining knowledge of the nature of reality through reason pure and simple.

The influence of the 'Critique' in the history of philosophy has been multiform and is to-day a factor to be reckoned with. The limitation of our knowledge to phenomena comes down in the French positivists and Herbert Spencer; for German idealism the laws of the understanding become the most important features in the structure of reality; and further consequences by way of Kantian ethics are, perhaps, even more far-reaching.

There are two English translations of the 'Critique of Pure Reason': one by Max Müller (2d ed., London 1896), and the other by J. M. D. Meiklejohn (London 1854 and reprints). The former is much the better. The great commentary in English is E. Caird's 'Critical Philosophy of Kant' (2 vols., London 1889). Four representative German interpretations are those of Kuno Fischer, H. Vaihinger, Erich Adickes and Cohen.

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CRITO, krī'tō, Greek philosopher. He was a friend and disciple of Socrates, whom he is said to have supported with his fortune. He made every arrangement for the escape of his master from prison and used every argument which ingenuity or affection could suggest to induce him to save his life by fleeing from his persecutors. His eloquence was, however, in vain and Socrates drank the fatal cup. Crito is a prominent interlocutor in one of Plato's dialogues, which is named after him. He was himself a voluminous writer on philosophical subjects, but all his writings have perished.

CRITOLAUS. (1) A celebrated Achæan demagogue, who incited his countrymen to insurrection against the Romans. He commanded the Achæan army at the battle of Scarphæa, 146 B.C., and when overthrown by Metellus, either committed suicide or perished in the marshes of the coast. He was the immediate cause of the war which terminated in the destruction of Corinth and put an end to the political existence of Greece. (2) A peripatetic philosopher, a native of Phaselis, a Greek colony in Lycia who studied philosophy at Athens under Aristo of Ceos, whom he succeeded as head of the Peripatetic School. In 155 B.C. he was sent with Carneades on a political mission to Rome. His philosophy attracted great attention at Rome. He was a noted rhetorician and orator. A Critolaus is mentioned by Plutarch, as the author of a work on Epeirus; and Gellius also speaks of an historical writer of this name.

CRITTENDEN, George Bibb, American military officer: b. Russellville, Ky., 20 March 1812; d. Dansville, Ky., 27 Nov. 1880. He was graduated at the United States Military Academy in 1832 and served as an officer in the Mexican War, rising to the rank of lieutenant-colonel. He joined the Confederacy at the outbreak of the Civil War, became a major-general and suffered defeat at Mill Spring, Ky., in 1862. He was kept under arrest in consequence and resigned his commission the following year. He served as a volunteer later and from 1867–71 was State librarian of Kentucky.

CRITTENDEN, John Jordan, American legislator: b. Woodford County, Ky., 10 Sept. 1787; d. near Frankfort, Ky., 26 July 1863. He was graduated at William and Mary College in 1807; in 1816 became a member of the State legislature; in 1817 was elected to the United States Senate; United States district attorney from 1827–29. He was subsequently re-elected twice to the United States Senate. In 1848 he became governor of Kentucky. He was again Attorney-General under President Fillmore and in 1855 was sent a fourth time to the Senate. In the Senate he urged unsuccessfully his famous compromise. After 1861 he served for one year in the House, and in that body also strove for the supremacy of the Constitution. Through his influence the State remained loyal to the Union in the Civil War. (See Crittenden Compromise). Consult the biography by his daughter, Mrs. Chapman Coleman (2 vols., Philadelphia 1871).

CRITTENDEN, Thomas Leonidas, American military officer: b. Russellville, Ky., 15 May 1819; d. Annandale, N. Y., 23 Oct. 1893. He was a son of J. J. Crittenden (q.v.) and was educated for the law. In 1842 he became State attorney for Kentucky; served as an officer in the Mexican War and in 1849 was appointed consul at Liverpool. On the outbreak of the Civil War he became brigadier-general of volunteers and in 1862 was promoted to major-general. He distinguished himself at Shiloh, Stone River and Chickamauga. He was placed ot the retired list in 1881.

CRITTENDEN COMPROMISE, 1860–61: the last desperate effort of the Southern Union party to avert secession and war, by permanently crystallizing the free and slave communities as they stood; dividing the boundaries on the line of the Missouri Compromise and engaging the Federal power to uphold slavery to the full, where it existed. In the session of Congress after Lincoln's election, the Constitutional Union party (q.v.) having broken down, John J. Crittenden of Kentucky, a leading Unionist senator, introduced a proposition for a constitutional amendment, in substance as follows: (1) Slavery to be abolished in all national territory north of 36° 30′ and recognized and protected south of it, the people to decide the status on its becoming a State; (2) not to be abolished in forts or other Federal territory in slave States; (3) nor in the District of Columbia while it existed in Maryland and Virginia, nor at all without consent of the inhabitants and compensation, nor slaveholders forbidden to bring their slaves thither; (4) the interstate slave-trade never to be prohibited; (5) the United States to pay for all fugitive slaves rescued by violence and sue the county of rescue, which could sue the individuals; (6) no future amendment ever to affect these provisions, nor Art. I, § 2, ¶ 3, nor Art. IV, § 2, ¶ 3 of the Constitution; nor to give Congress power to abolish slavery in a slave State. Four resolutions were appended, declaring the Fugitive Slave Act constitutional, urging the repeal of the State personal-liberty laws, promising the modification of two specially obnoxious features of the Fugitive Slave Law and the rigorous suppression of the outside slave-trade. The legislatures of Virginia, Kentucky, Tennessee and New Jersey instructed their delegates to the Peace Conference of 1861 to support it. In Congress, Crittenden continued to press it during the session. It was lost in the House 14 Jan. 1861, 113 to 80; in the Senate 2 March, 20 to 19.

CRITTENTON, Charles Nelson, American philanthropist: b. Adams, Jefferson County, N. Y., 1833; d. San Francisco, Cal., 16 Nov. 1909. He engaged in the drug business in New York in 1861; but after 1882, when his five-year-old daughter Florence died, he devoted his time and wealth to the establishment of Florence Crittenton Homes for homeless and unfortunate girls and their infant children. In 1895 the National Florence Crittenton Mission was incorporated to carry on this work. Of these mission homes 75 were organized in Mr. Crittenton's lifetime in all the larger cities of the United States and in Marseilles, Tokio, Shanghai, Mexico City, etc. The drug-manufacturing company which bore his name was one of the first profit-sharing concerns in the United States. He was an active member of the Prohibition party.

CROATAN, or CROATOAN, “The Lost Colony.” (For Raleigh's attempt to colonize Roanoke Island, see Roanoke Colony). In 1587 he abandoned the effort and incorporated a company to settle on Chesapeake Bay, entitled “The Governor and Assistants of the City of Raleigh in Virginia.” A colony of about 140 persons was left there. Raleigh's attempts to rescue them were unsuccessful and the fate of the colonists was unknown till Indians told the settlers at Jamestown. They had accepted the friendly invitation of the Croatan Indians to live among them and remained there probably till not long before the Jamestown settlement in 1607, doubtless intermarrying considerably; then the priests or medicine-men had urged “Powhatan” to kill them — probably from jealousy of the influence their superior intelligence gave them — and all had been murdered except four men and two boys saved by one of the chiefs to work his copper-mines, and a “young maid” saved probably for a wife, who may have been Virginia Dare. The latter escaped up the Chowan and her ultimate fate is unknown; the boys seem to have died or been killed; but the men were taken westward with the small tribe to somewhere around the Neuse or the Cape Fear River in North Carolina. They or their predecessors taught the natives to build two-story stone houses, make roads, use improved agricultural methods, etc. The Huguenots found these Indians there in 1709 and noted their farms and roads and their gray eyes, different from those of any other Indians; and the protest of a chief of some mixed-blood Indians from Robeson County, N. C., over a murder in 1864, led to an investigation which has instilled a belief that they are the descendants of the Croatan tribe and the colonists. The State has officially recognized them as “Croatan Indians,” and their language is said to contain many English words. However this may be, the actual fate of the “lost colony” rests on evidence it is absurd to discredit and on which in fact we base unquestioned conclusions as to all other early Virginian history. Consult William Strachey, 'Travaille into Virginia' (Hakluyt Soc., Vol. VI); Hamilton McMillan, 'Raleigh's Lost Colony' (1888); chart reprinted in Brown's 'Genesis of the United States,' where on the Neuse (apparently) is marked a place at which remained «four men clothed,» who had «come from Roanoke.»

CROATIA-SLAVONIA, krō-ā'shĭ-a (in Serbo-Croatian, *Hrvatska-Slavonija*), a Hungarian crownland bounded north by Styria and Hungary, from which it is separated by the rivers Drave and the Danube; in the south it is divided from Serbia and Bosnia by the Una and the Save, southwest by Dalmatia, Istria and the Adriatic and northwest by Kraina and Styria. Total area 16,421 square miles. Pop. (census of 1910), 2,621,954. The country is agricultural, 82 per cent of the population being engaged in agricultural pursuits. It is most picturesque (especially «Zagorje»), in the Karst district, fir, beech and oak forests cover the land, as also rich pastures and good vineyards. The lowlands of Slavonia, Syrmia (Srem) and especially Frushka Gora are arable and most fertile. There grow all kinds of cereals, potatoes, hay, grapes of good quality, apples, prunes, nuts and, near the coast, figs, oranges and other tropical and semi-tropical fruits. The mountains form a continuation of the Julian Alps and are very rich in coal, marble and mineral wells containing sulphur, copper and iron; in the north a small branch of the Carnic Alps forms the watershed between the principal rivers, the Save and the Drave.

Climate.— Considering the situation of Croatia-Slavonia the climate is rather moderate and the country could be divided into three parts: (1) The narrow strip of land above the sea with mild winters, warm autumns and dry summers; (2) the level land Slavonia with very hot summers and severe winters and (3) the Zagorje (western Croatia) with prolonged and severe winters and short summers which are often tempered by the northeastern wind called Bora.

Industries.— The manufacture of wine constitutes one of the chief industries of the country and the peasantry use wine freely as their principal beverage. Vineyards are most numerous in Syrmia, but they are frequent also in the coastland. In the western part, however, they have been devastated by phylloxera. Oak and beech forests are abundant, especially in Slavonia where there are even virgin forests, and form the principal wealth of the country. The timber is of excellent quality and is used in various industries, even in shipbuilding. The surplus of the production is exported mostly to France. Great quantities of acorns furnish good food to numerous herds of pigs which are exported. Horses of two races, the Hungarian in the plains and the Bosniana in the mountains, oxen, pigs and sheep are the principal domestic animals. Silkworms have been cultivated to an appreciable degree only since the reign of Maria Theresa, but the silk industry is still in its infancy. The same could be said of the industries of glass, paper, chemicals and tobacco. Hemp and flax are woven by the peasants, of which they manufacture their own clothes with much originality in design and shape. Owing to the lack of native capital the commerce is in a deplorable state. It is practically controlled by Germans, Magyars and Jews. The principal articles of export are: Timbers, wine, cereals, plums, plum-brandy, horned animals, wax, honey, etc. The principal ways of communication are the Drave, the Save and partly the Danube, but there are also railways (about 1,000 miles in all) connecting the country with the Adriatic and Bosnia.

Education.— Education is compulsory for all children between the ages of 11 and 12. There are elementary schools in great numbers all over the country; 21 high schools and secondary schools with an aggregate staff of 320 professors and about 6,500 students. At Zagreb there are, besides the university, schools of arts and crafts, commercial academies, academy of forestry and normal school of rural economy, music schools, high schools for girls, the Normal Teachers' Institute and the Nautical School.

Language and Literature.— The language and literature of the Croatians and Slovenians is Serbian (see SERBIA) in its quintessence. However, there are some dialectic differences. The literature of the Croats and the Slovenians is consequently only a branch of the Serbian and it is hard to establish the borders in that field. The Croatians and the Slovenians use in their written language the Latin alphabet, modified somewhat by means of certain diacritics, while the Serbians, like the Russians, remained faithful to their Cyrillic alphabet, derived from the Greek characters, by the so-called Slav apostles, saints Cyrill and Methodius, and modified by Vuk Stefanovich Karadzić.

History.— The Croatians are virtually the trans-Danubian Serbians, having the same ethnographic characteristics and speaking absolutely the same language as the Serbians in Shumadia, Montenegro, Bosnia-Herzegovina, etc., with the exception of some slight dialectic differences, due chiefly to foreign influences. The inhabitants are chiefly Serbo-Croats and Slovenians («Slovenci») with some admixtures of other races (Magyars, Germans, Gypsies, Jews, etc.), and they belong to the Catholic Church, represented by the archbishop of Zagreb (Agram), and the Orthodox Church, represented by the patriarch of Karlovci. It is not certain when and from where the Croats came to inhabit the Adriatic littoral, nor is it possible to establish the exact frontiers of their original state. Their primitive abode must have been on the slopes of the Carpathians and the provinces to which they immigrated were situated around the cities of Clissa, Trannona and were divided into 11 counties, ruled by counts, and one principality consisting of three counties, ruled by a ban (or prince). The Croatians, like their brothers, the Serbians, were pagan and the cultured Catholic priests, who were then numerous in Dalmatia, energetically spread Christianity among them; but it was only in the 9th century that, with the aid of the Byzantine Emperor Heraclius, they were baptized in any considerable numbers. Their first metropolitan had his palace in Spalato. But when the ever-growing state of the Franks spread its authority over the Croatian lands and Louis, the ban of the Croatians of Save, endeavored to resist their dominion with his army, Borna, the ban of the Dalmatian Croatians, aided the Franks and frustrated the patriotic plans of his northern brother. Ban Louis's successors (Ratimir, Mutimir and Bralsav, 872–882) fought bitter battles against the Moravians, while the Dalmatian Croatians were engaged in a secular struggle against the Venetian Republic. Borna's successors extended their territory in Istria, the Velebit Mountains and in Gorica and (in 910) Ban Tomislav assumed the title of king. But it was only under King Zvonimir that Croatia grew to any considerable size, for he took possession of Naretna and part of Bosnia. No sooner had the Croatians succeeded in forming a powerful state than their leaders, torn by their vices and inordinate desire for power, started a state of anarchy which was followed by numerous civil wars. The Hungarians took advantage of the disaster and their King Koloman found the country an easy prey and had himself crowned king of Croatia and Dalmatia. He granted to the Croatians a sort of constitution which still more humiliated them and made their own native dynasties, their bans, almost slavish vassals of the Hungarian Crown. When the Turks conquered Bulgaria, Serbia and Bosnia, the principal objective of their expansion was the level land of Hungary, but they found bitter resistance in Croatia under the celebrated Nikola Zrinski, who perished in the siege of Siget. The Austrian court utilized the opportunity to subjugate Croatia with the result that a fierce insurrection of the peasantry broke out during the reign of Emperor Maximilian II. In the course of the 16th and 17th centuries the Croatian lands were called «reliquiæ reliquiarum» and, for the purpose of making the Croatians better fitted for resistance to the Turks, the Austrian government nominated a king of Croatia, Dalmatia and Slavonia. A wholesale Germanization of the Croatians and the Slovenes was practised for over three centuries, but the national spirit was kept alive, as in Serbia, by means of the cherished traditions and especially by the exuberant and enchanting national poetry about Royal Prince Marko, the Battle of Kossove, etc., which rapidly spread from Serbia and Montenegro throughout the Serbian-speaking lands of the Hapsburg Crown. It was only in the beginning of the last century, when Napoleon, by virtue of the treaties of Pressburg (1805) and Schönbrunn (1809) won the united Dalmatia, a large part of Croatia, Istria, Gorica, Gradiska, Carinthia and Carniola, giving them the collective name of «Illyrian Provinces» and organizing them under a single administration, that the Serbo-Croatian people inhabiting those lands realized that their language, traditions and aspirations were absolutely identical and that they formed one and the same nation. Unfortunately, when those provinces were taken from France at the Congress of Vienna (1815) and restored to the Hapsburgs, the national spirit and language were once more condemned and prosecuted. The Serbo-Croatians resented sharply the ever-growing Germanization and Magyarization and, when the Magyars passed certain laws in their Parliament in 1848, whereby the autonomy of Croatia was virtually annulled, and when the whole of Hungary revolted against the court of Vienna, ban of Croatia, Jellachich, upon advice from Austria, immediately declared war on the Hungarian Revolutionary Cabinet and, with his army of 40,000 men, largely contributed in suppressing that insurrection. The Serbians in Hungary, who also rose against their Magyar oppressors, now demanded their long-promised autonomy, which they finally obtained in the so-called «Voyvodina» dukedom, comprising Syrmia (Srem), Bachka and the Banat, only to be shortly afterward suppressed by the Austrian government. The Croatians were treated in like manner, for they were abandoned entirely to the mercy of the revengeful Magyars and a reactionary policy of the blackest type was started. When, however, the Austrian government collapsed (in 1859) and the necessity of Serbo-Croatian help was again keenly felt, several Serbo-Croatian deputations were kindly received in Vienna and the just demands of the people were granted. The Serbo-Croatian language was reintroduced in the national schools and the local administration and, in 1868, a treaty between the Serbo-Croatians and the Hungarians was concluded whereby the former secured complete independence in their national aspirations. But the notorious Ban Khnen Hedewary (1883–1903) eluded most of the treaty stipulations and executions of most notable Croatians in Agram (1907) and Vienna (1908) accelerated the formation of the Serbo-Croatian coalition which complicated more than any other event the difficult South Slavonic problem in Austria-Hungary. The struggle of the Slovenes (or Slovenians) against their German oppressors resulted first in their literary emancipation, which was started by their patriot Blaiweiss (1843) and then in their political development which secured for them an overwhelming majority both in their home Diet and their municipal government.

Government.— The political administration of Croatia is now controlled by 8 county councils and 70 district councils. The supreme authority is vested in the autonomous government in Zagreb (Agram), whose chief is the ban. The whole constitutional life of the nation is regulated by the Royal Constitution formulated in the Croatio-Hungarian Agreement of 1868, by which the political relation between Croatia-Slavonia and Hungary was determined. At the head of the provincial government in Agram stands the ban who is appointed by the Hungarian Prime Minister, subject to the approval of the king. The local government consists of three ministries, Interior, Worship and Education and Justice. The Croatian Diet sends 40 delegates to the Hungarian Lower House and 3 to the Upper House. The parliamentary responsibilities of the ban and the heads of the districts are defined in a special law. All other matters come under the jurisdiction of the joint Cabinet in Budapest. The financial relations between Croatia and Hungary were regulated by a special agreement whereby Croatia receives 44 per cent of her income for the defraying of her autonomous expenses, the remaining 56 per cent being reserved for the joint treasury to meet all joint expenses.

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W. M. PETROVITCH,
Chief Slavonic Division, New York Public Library.

CROCHET, krō-shā′, a species of knitting performed with a small hook of ivory, steel or wood, the material used being woolen, cotton or silk thread.

CROCIDOLITE, krō-sĭd′ō-līt (Gr. «thread-stone») a mineral of the amphibole group composed of long, delicate fibres and also occurring massive and earthy, and then called abriachanite. It has the formula $NaFe(SiO_3)_2.FeSiO_3$, part of the iron being frequently replaced by magnesium and calcium and part of the sodium by hydrogen. The mineral has a hardness of 4 and a specific gravity of about 3.25. The fibrous varieties have a silky lustre and vary from blue to green. Crocidolite occurs in Griqualand West, Africa, in the Vosges Mountains of France and Germany, in Greenland, in Ontario and in Rhode Island. The South African varieties are often altered by oxidation of the iron and by infiltration of silica, until they are of a brown or yellow color and exhibit a chatoyant lustre. Specimens of this kind are known as «tiger-eye,» and, when polished, are used in the manufacture of umbrella handles and other ornamental articles.

CROCIN, $C_{44}H_{70}O_{28}$, a coloring matter obtained from the fruit of *Gardenia grandiflora,* Chinese yellow pods, *hwang-chi,* which is largely used in China for dyeing silk, wool and other fabrics yellow. The color is extracted from the pods by a complex process and forms a red powder, which is soluble in water and in spirit. By dilute acids it is decomposed into *crocetin,* which dyes a fine yellow. Crocin has been identified with a body obtained from saffron.

CROCKER Charles, American capitalist: b. Troy, N. Y., 16 Sept. 1822; d. Monterey, Cal., 14 Aug. 1888. He received a common school education and went to California in 1849, where he opened a store. In 1860 he was elected to the State legislature. With Leland Stanford, Mark Hopkins and Collis P. Huntington, he projected and completed the Union Pacific Railroad system.

CROCKER, Francis Bacon, American electrician: b. New York, 4 July 1861. He was graduated at Columbia University in 1882; was employed as electrical engineer in 1882–89; became vice-president of the Crocker-Wheeler Electric Company in 1888 and professor of electrical engineering in Columbia University in 1889. He has taken a prominent part in the national and international standardization of electrical apparatus. He was president of the American Institute of Electrical Engineers in 1897–98, of the New York Electrical Society in 1892–95; and is author of ‘Practical Management of Dynamos and Motors’ (1892); ‘Electric Lighting’ (2 vols., 1896–1901; 8th ed., 1908); ‘Electric Motors’ (1910), etc. The honorary degree of master of science was conferred upon him by Columbia University in 1914.

CROCKET, a Gothic architectural ornament projecting boldly, usually in imitation of curved and bent foliage, but sometimes of animals, placed on the angles or the sides of the pinnacles, canopies, gables, etc. The name is also given to one of the terminal snags on a stag's horn. This ornament is probably derived originally from the corner volutes of the Corinthian type of capital with the acanthus leaves curled up under them.

CROCKETT, David, an American pioneer: b. Limestone, Greene County, Tenn., 17 Aug. 1786; d. Alamo, Tex., 6 March 1836. He spent a number of years in hunting and pioneer work in western Tennessee, and finally settled in Franklin County in 1811. He served in the Creek War under Jackson; and in 1821 and 1823 was elected to the Tennessee legislature. In 1826 and 1828 he was elected to Congress; was defeated for re-election in 1830 because of his outspoken opposition to Jackson's Indian bill; but was again a successful candidate in 1832. In Washington, although his eccentricities of dress and manner excited comment, he was always popular on account of his shrewd common sense and homely wit; although generally favoring Jackson's policy, he was entirely independent and refused to vote to please any party leader. At the end of his congressional term, he joined the Texans in their war against Mexico, and in 1836 was one of the force of 140 which defended Alamo, and, as one of the six survivors who surrendered, was shot by order of Santa Anna. He was unlettered and probably dictated the following works, of which he is the acknowledged author: ‘A Narrative of the Life of David Crockett’ (1834); ‘A Tour to the North and Down East’; ‘Exploits and Adventures in Texas’; ‘Sketches and Eccentricities’ (1847). The best popular biography is by E. S. Ellis (Philadelphia 1884).

CROCKETT, Samuel Rutherford, Scottish novelist; b. Little Duchrae, Galloway, 24 Sept. 1860; d. Avignon, France, 18 April 1914. He was educated at Edinburgh and Oxford, and entering the ministry of the Free Church of Scotland in 1886 was for several years pastor at Penicuik. A volume of verse, ‘Dulce Cor,’ and ‘The Stickit Minister,’ his first novel (1893), showed literature to be his vocation. He produced in rapid succession a series of novels, about 50 in all, making his native Galloway country on the Scottish border his special field. He was one of the leaders of the «Kailyard School,» with Ian Maclaren and James M. Barrie. His later works include ‘The Raiders’ (1894); ‘The Lilac Sunbonnet’ (1894); ‘Mad Sir Uchtred’ (1894); ‘Bog Myrtle and Peat’ (1895); ‘The Men of the Moss Hags’ (1895); ‘Sweetheart Travelers’ (1896); ‘Cleg Kelly’ (1896); ‘Lad's Love’ (1897); ‘Lochinvar’ (1897); ‘The Standard Bearer’ (1898); ‘The Black Douglas’ (1899); ‘Kit Kennedy’ (1899); ‘Joan of the Sword Hand’ (1900); ‘The Stickit Minister's Wooing’ (1900); ‘Love Idylls’ (1901); ‘The Dark o' the Moon’ (1902); ‘Raiderland’ (1904); ‘Maid Margaret’ (1905); ‘Sir Toady Crusoe’ (1905); ‘The Cherry Ribbon’ (1906); ‘White Plumes of Navarre’ (1906); ‘Little Esson’ (1907); ‘Deep Moat Grange’ (1908); ‘Men of the Mountain’ (1909); ‘Dew of their Youth’ (1910); ‘Love in Pernicketty Town’ (1911); ‘The Moss Troopers (1912); ‘Sandy's Love Affair’ (1913).

CROCODILE, a huge reptile of the genus *Crocodilus* and order *Crocodilia*, distinguished from the other genera of the family by having the enlarged fourth lower tooth fitted into an emargination, and not a pit, in the upper jaw, the dorsal head and trunk plates not united and the nasal bones not entering the nasal canal as a septum. The bones of the head have a peculiar corroded and pitted appearance, the skin is marked into transverse rows of hard quadrate areas and in addition protected dorsally by large keeled bony scutes, and the tail is provided with a partly double crest. Although fitted for terrestrial locomotion, the feet are as well adapted for aquatic life by being webbed. More remarkable adaptations for life beneath the waters are valves on the snout for closing the nostrils and external ear openings, and especially the arrangement by which the glottis fits into the internal nares, enabling the crocodile to breathe while the mouth is open and to hold a struggling animal beneath the surface until it drowns. A crocodile's stomach is constructed much like a bird's gizzard and is a receptacle for stones and other hard substances by which the food is ground. About 10 living species are known, all of which are strictly aquatic animals; three are American, an equal number African and the remainder distributed through the Indo-Malayan and North Australian regions.

The only species which enters the United States is *C. americanus*, which is of rare occurrence in southern Florida, where it has been known to exist since 1875, but more common in the West Indies, Central and South America. Little has been written of its habits. It may be readily distinguished from the very much more abundant alligator by the longer, more slender snout with a median ridge, besides the generic characters mentioned above. The extreme length appears to be about 14 feet. Unlike the alligator it enters brackish and salt water. The African crocodile (*C. vulgaris*) is the longest and best known. It ranges throughout the continent and swarms in the waters of Madagascar and of the upper Nile, but has been exterminated in lower Egypt. Like the alligator, the crocodile is essentially a scavenger, but attacks, drowns and devours various animals which enter the water in which it lives, not excepting full grown cattle, or even man, especially after nightfall. It is said that, like the tiger, the crocodile acquires a taste for and prefers human flesh. The Mugger, or crocodile of the Ganges, is *C. palustris*. It is the object of religious worship by the natives. Crocodiles construct dens in the river banks above the water level, which they enter by means of long burrows opening beneath the water; they are used as retreats in case of danger, and in which to devour their prey. Numerous eggs are deposited in a hole or nest in dry earth, the mother remaining near to guard them, a point in which as, indeed, in most of its habits the crocodile resembles our well-known alligator (q.v.). In one of its associates, however, it is unique. A species of leech (*Limnatis nilotica*) infests the great saurian's mouth, which is said to be habitually entered by a plover-like bird for the purpose of feeding upon the parasites. It is not clear to just what species of bird this habit is to be attributed, but most ornithologists consider it to be *Pluvianus ægyptius*. The Egyptian crocodile was anciently the object of elaborate worship, possibly, as was suggested by Eusebius, because it appeared in greatest numbers at the time of the flooding of the Nile; hence it was connected with the fertility of the soil, was cared for by the priests, and in many cases embalmed after death.

CROCODILE-BIRD, an African plover, credited since the days of Herodotus with entering the open mouths of basking crocodiles to feed on the bits of food clinging to the reptiles' teeth, or possibly to pick out parasites. Two noisy plovers common along African river-banks, and both called «zic-zac» from their cries, are said to indulge in this dangerous performance, but the name crocodile-bird belongs more properly to only one of them — the crested, spur-winged plover (*Hoploptenus spinosus*) of the Nile Valley. There is good evidence that this bird does actually enter the mouth of crocodiles, which welcome the bird's attentions. Consult Lydekker, ‘Royal Natural History’ (Vol. IV).

CROCODILES, Fossil. Crocodiles are a very ancient group of reptiles and were much more abundant and widespread in former geological periods, when the climate was more tropical than it is to-day. They have changed comparatively little in external appearance from the beginning of the Age of Reptiles until now, and the bony plates over the head and back were from the first characteristic of them. The most ancient crocodilian animals were the *Belodontia* (see BELODON) of the Triassic Period, partly intermediate between crocodiles and dinosaurs and with many archaic characters. In the succeeding Jurassic Period flourish primitive marine and fresh-water crocodiles (*Teleosaurus, Bemissartia, Goniopholis*), in which the vertebræ were bi-concave instead of convexo-concave, as in true crocodiles. In the later Cretaceous and Tertiary periods true crocodiles were abundant, their range extending much farther north than it does now. They are found in the New Jersey green sands, in the Bad Lands of western United States and Canada, and in various parts of northern and central Europe, and their distribution was probably world-wide and not restricted, as now, to tropical or sub-tropical regions.

CROCODILIA, a sub-class of reptiles characterized by the possession of four well-developed, approximately equal legs, long tails, fixed quadrate bones, teeth firmly implanted in alveolæ and restricted to the jaws, solid vertebræ, cervical and thoracic ribs with distinct tubercular end capitula, compound abdominal ribs, simple pubic bones and the separateness of the two pubic bones and ischia. There is a strong quadratojugal arch in the skull. The cloaca is longitudinal and the copulatory organ of the male is single and anterior. The heart is almost perfectly divided into four chambers; the limbs, head and body-walls receive arterial blood, while that which goes into the viscera is mostly venous. The existing *Crocodilia* are divided into gavials (q.v.), with long and slender snout and a large number of approximately equal teeth, and crocodiles and alligators (qq.v.), with a relatively blunt snout and unequal teeth. For the differences between alligators and crocodiles, see the articles on these animals.

CROCOITE, native chromate of lead, $PbCrO_4$. Crocoite crystallizes in prismatic forms belonging to the monoclinic system, and also occurs in granular and columnar forms. It is scarlet red in color and translucent, with an adamantine lustre. It has a hardness of from 2.5 to 3 and a specific gravity of about 6. It was in this mineral that Vauquelin discovered the element chromium in 1797. Crocoite occurs in the Ural Mountains, also in Brazil, and in small quantities in Hungary, the island of Luzon and in Maricopa County, Ariz. Tasmania is by far the most important locality, having produced many specimens which rank among the finest mineral specimens known.

CROCUS, in mythology, a youth who was enamored of the nymph Smilax and changed into the flower which was named after him. According to another tradition he was metamorphosed by his friend Hermes, who had killed him in a game of discus. Consult Ovid, Metam. IV, 283.

CROCUS, a genus of perennial herbs of the family *Iridaceæ*. It includes about 70 species characterized by corms, showy, long, funnel-shaped, erect, sometimes fragrant flowers of six nearly equal segments, three stamens and a three-celled ovary containing numerous nearly globular seeds. They blossom in autumn or early spring, the spring species being most widely known, and valued for their diversely colored flowers, the ease with which they are cultivated, and the cheapness of the corms, commonly called bulbs. The corms are planted about three inches deep in any good garden soil in autumn, and allowed to remain for several years, when, owing to the formation of the new corms above the old ones, the plants are in danger of becoming uncovered. The little corms which have been developed by the old ones are separated, stored in a dry place until autumn and replanted. They are often planted in lawns, but must there be frequently renewed, because in two or three years the grass chokes them. *C. sativus* yields the formerly well-known dye, saffron, which was prepared from the dried stamens. This coloring-matter has been largely replaced by aniline dyes. About 30 species are cultivated in American gardens and greenhouses. Consult Bailey, 'Cyclopedia of American Horticulture' (New York 1914).

CROCUS, or COLCOTHUR, a polishing powder composed of oxide of iron and prepared by calcining ferrous sulphate. Crocus is purplish in color and differs from rouge chiefly in its comparative coarseness. (Formerly called «crocus of Mars» or «crocus Martis astringens»).

CROES, John James Robertson, American civil engineer: b. Richmond, Va., 5 Nov. 1834; d. 1906. He was graduated at the College of Saint James, Maryland, in 1854; and was engaged as civil engineer, principally in hydraulic and sanitary work, after 1856. He was engaged in the waterwork construction in New York, Brooklyn and Washington; became an expert on the problem of water-supply, sewerage, waterworks and water power valuation, irrigation and rapid transit in cities; and wrote numerous articles on engineering subjects. He was treasurer in 1877–87 and president in 1901 of the American Society of Civil Engineers. He was editorial writer for the *Sanitary Engineer* 1880–90.

CRŒSUS, krē'sus, king of Lydia of the Mermnadæ line. He succeeded his father, Alyattes, 560 B.C. The territory governed by him included nearly all of Asia Minor, which he had conquered. His riches, obtained chiefly from mines and the gold dust of the river Pactolus, were greater than those of any king before him, so that his wealth became proverbial. Proud of his treasures, he carried his love of splendor to extravagance and thought himself the happiest of men. His capital, Sardis, became the brilliant centre of arts and letters. The legend says that, vain of his wealth, he asked the philosopher Solon what he thought of his good fortune. «I pronounce no man fortunate until his death,» was the sage's reply. Subsequently Crœsus was made prisoner by Cyrus, king of Persia. When seated on the funeral pyre and about to be burned to death, he recalled the words of Solon, and thrice repeated his name. Cyrus demanded an explanation. Crœsus gave it, and Cyrus not only spared his life but also took him into his favor and protection. At the death of Cyrus he recommended Crœsus to the favor of Cambyses. Consult Horo and Wells, 'A Commentary on Herodotus' (Vol. I, pp. 99–100, Oxford 1912); Jebb, 'Bacchylides' (London 1905).

CROFFUT, William Augustus, American prose writer and poet: b. Redding, Conn., 29 Jan. 1835; d. Washington, D. C., 31 July 1915. Engaged in journalism from 1852 and connected editorially with leading newspapers, he was widely known as correspondent and humorist, and as one of the earliest shorthand reporters. He received the degree of Ph.D. from Union College; was executive officer of the United States Geological Survey, 1888–94; wrote opening ode of Chicago Exposition, 1893. He published 'War History of Connecticut' (1867); 'A Helping Hand' (1868); 'Bourbon Ballads' (1880); 'A Mid-Summer Lark' (1882); 'Deseret,' a comic opera — Mormon theme — music by Dudley Buck (1882); 'The Vanderbilts' (1886); 'The Prophecy and Other Poems' (1893); 'The Folks Next Door' (1902); 'Fifty Years in Camp and Field' (1909); and many pamphlets.

CROFTERS, a term applied in Scotland to a species of small farmers, the occupiers of small pieces of land, from which they derive their livelihood, or great part of it, by cultivation or rearing and grazing cattle. Their origin can be traced to the fact that the chiefs of the clans came to be regarded as proprietors of the land. The followers of the chieftains settled on the land, paying rent in lieu of personal services. Crofters are numerous in the Highlands and Western Islands of Scotland, and they live for the most part in townships, each with his own piece of arable land, but with a joint tenancy in mountain pasture. From some districts, in recent times, they have been summarily removed to make room for sheep farms and deer forests, so that they are now chiefly congregated on the seashore, where they are able to maintain themselves in part by fishing, and generally eke out a precarious existence. They have often complained of many grievances, such as high rents, want of compensation for disturbance, small holdings, excessive local rates and want of harbors and railways. In the early 19th century measures for relief were undertaken. A parliamentary commission was appointed in 1883 to investigate their conditions. Under the Crofters Act (1886) some of these hardships have been removed, and great reductions of rent granted. This act is applicable only to the counties of Argyle, Sutherland, Inverness, Caithness, Ross and Cromarty, and Orkney and Shetland, where there are estimated to be 40,000 families of the crofter class. There are crofters to some extent also in other counties, but generally these seem to be in more favorable circumstances. (See SCOTLAND). Consult Dalriad, 'The Crofter in History' (Edinburgh 1888); Guernier, 'Les crofters écossais' (Paris 1897).

CROFTS, Ernest, English painter: b. Yorkshire, 15 Sept. 1847; d. 19 March 1911. He studied art at London and Düsseldorf, and first exhibited at the Royal Academy in 1874. He became a Royal Academician in 1896. He attained celebrity as a painter of historic battle scenes. His works include 'Napoleon at Ligny' (1875); 'The Morning of Waterloo' (1876); 'Cromwell at Marston Moor' (1877); 'Wellington's March from Quatre Bras' (1878); 'The Evening of Waterloo' (1879); 'Napoleon Leaving Moscow' (1887); 'The Execution of Charles I' (1890); 'The Conspirators' Last Stand at Holbeach House' (1896).

CROGHAN, krō'gan, **George**, American military officer: b. near Louisville, Ky., 15 Nov. 1791; d. New Orleans, 8 Jan. 1849. He was graduated at William and Mary College in 1810, and greatly distinguished himself at the defense of Fort Meigs and Fort Stephenson in 1813, receiving a gold medal from Congress. In 1814 he became lieutenant-colonel but resigned in 1817 and was appointed postmaster at New Orleans in 1824. He became inspector-general with the rank of colonel in 1825, joined General Taylor's forces in Mexico in 1846 and took part in the battle of Monterey.

CROKER, B. M. (SHEPPARD), English novelist. She was married to Lieut.-Col. John Croker of the Royal Munster Fusiliers, and spent 14 years in India and Burma. Her writings include 'Pretty Miss Neville' (1883); 'Some One Else' (1884); 'A Bird of Passage' (1886); 'Diana Barrington' (1888); 'Two Masters' (1890); 'A Family Likeness' (1892); 'Village Tales and Jungle Tragedies' (1894); 'Married or Single' (1895); 'The Real Lady Hilda' (1895); 'In the Kingdom of Kerry' (1896); 'Beyond the Pale'; (1897); 'Miss Balmaine's Past' (1898); 'Terence' (1899); 'A State Secret' (1901); 'Angel' (1901); 'The Spanish Necklace' (1907); 'Katherine the Arrogant' (1910); 'In Old Madras' (1913); 'Lismore' (1914).

CROKER, John Wilson, Irish miscellaneous writer: b. Galway, 20 Dec. 1780; d. Hampton, 10 Aug. 1857. He was educated at Trinity College, Dublin, and entered Lincoln's Inn as a student in 1850, being admitted to the Irish bar two years later. His capacity for satire revealed itself in 'Familiar Epistles,' a clever satire on the Irish stage, and 'An Intercepted Letter from Canton.' His 'Songs of Trafalgar' spread his fame as a poet. In 1808 he issued 'State of Ireland, Past and Present,' a pamphlet on Catholic emancipation, which brought him before the notice of the politicians; and in the same year he was elected member of Parliament for Downpatrick. In 1809 he became Secretary to the Admiralty, a post which he held for more than 20 years. He was one of the founders of the *Quarterly Review*, and contributed many violent political articles, as well as many personal and abusive criticisms, notably of Keats' 'Endymion.' He was caricatured by Disraeli in 'Coningsby.' Macaulay's review of Croker's edition of Boswell's 'Life of Johnson' and the latter's counterblast on Macaulay's 'History of England' are among the celebrities of literary duels. He was a Tory politician of intense fervor, permanently resigning his seat in Parliament because of the passage of the Reform Bill of 1832. He published also 'Stories from the History of England for Children' (1817) and a poem, 'The Battle of Talavera' (1809), which received much praise. Consult Jennings, 'Diaries and Correspondence of Croker' (London 1884).

CROKER, Richard, American politician: b. Black Rock, Ireland, 24 Nov. 1843. When two years of age he came to America with his parents and received his early education in the public schools of New York city. Associating himself with Tammany Hall, he became prominent in politics during the scandal of the Tweed ring, whose schemes he vigorously opposed. In 1868–70 he was alderman; 1873–76, coroner; 1883–87, city fire commissioner; 1889–90, city chamberlain; also being the recognized leader of Tammany Hall 1884–1903. In the latter year he retired to a country life in England and Ireland, as a recreation interesting himself in horseracing. In 1907 he won both the English and the Irish "Derby" with his racehorse Orby. In 1908 he was made a freeman of the city of Dublin. Consult Lewis, 'Richard Croker' (New York 1901).

CROLL, krōl, **James**, Scottish geologist: b. Little Whitefield, Perthshire, 1821; d. Perth, 15 Dec. 1890. He received the ordinary education of a peasant's son and then studied philosophy and physical science and published a treatise on ‘Physical Cause of the Change of Climate During the Glacial Period’ (1864). In 1859 he was appointed keeper of the museum in the institution known as Anderson's University, Glasgow, a position which he occupied till his appointment to a minor post in the Geological Survey of Scotland in 1867. His writings include ‘The Philosophy of Theism’ (1857); ‘Climate and Time in their Geological Relations’ (1875), perhaps his ablest work; ‘Discussions on Climate and Cosmology’ (1886); ‘Stellar Evolution’ (1889); ‘The Philosophical Basis of Evolution’ (1890). Consult Irons, T. C., ‘Autobiographical Sketch of James Croll, with Memoir of His Life and Work’ (London 1896).

CROLLIUS, Oswald, German chemist: b. Wetter, Oberhessen, about 1580; d. 1609. He is remembered as author of a Latin work entitled ‘Basilica Chymica,’ which appeared at Frankfort in 1609 and went through 18 editions, was translated into French, into German and by Richard Russell into English under the title of ‘Royal and Practical Chymistry’ (London 1670). This is a remarkable mixture of speculative ideas about the action of chemical substances in different diseases and practical skill in the preparation of the substances themselves. Crollius was obviously quite familiar with the details of the processes he described, although they sometimes would, sometimes would not, yield the bodies he intended, and although he was of course ignorant of the true composition of many of them. By his manipulative skill he discovered new preparations, which he introduced into medicine, and which still remain, and this practical ability seems to have given weight to his therapeutic theories.

CROLY, krō'li, **Jane Cunningham** («Jennie June»), American author and journalist: b. Market Harborough, England, 19 Dec. 1831; d. New York, 23 Dec. 1901. She removed to New York in 1841, and in 1856 married D. G. Croly. She was editor of *Demorest's Magazine* 1860–87, and of *The Cycle* and *The Home-maker*. She was one of the founders of «Sorosis» and its president for 14 years; founded the New York Women's Press Club in 1889 and in 1892 became professor of journalism and literature in the Rutgers' Women's College; and was one of the most active promoters of the Federation of Women's Clubs. She published ‘Talks on Women's Topics’ (1863); ‘For Better or Worse’ (1875); ‘Three Manuals for Work’ (1885–89); ‘History of the Women's Club Movement in America’ (1900), etc. Consult ‘Memories of Jane Cunningham Croly, «Jennie June»’ (New York 1904).

CROMARTY, krō'mĕr-tē, Scotland, a former county in the north, consisting of 14 detached portions scattered over the county of Ross, with which county it is now entirely incorporated. The total area was about 220,800 acres. This singularly awkward county was formed at the request of an earl of Cromarty, who desired that one county might contain all his lands wherever situated.

CROMARTY FIRTH, a long, narrow inlet of the sea running into the united county of Ross and Cromarty in a southwesterly direction, and having a length of about 18 miles and an average breadth of two to five miles, and from 5 to 40 fathoms deep. Its entrance from the Moray Firth, between two bluff-wooded headlands called the Sutors of Cromarty, is about a mile wide, with 30 to 40 fathoms of water. Being completely landlocked it affords excellent shelter for shipping and is often crowded in stormy weather. At its upper end it receives the river Conan, and this portion of the firth is shallow, several square miles of mud-flats being laid bare at low water. On its shores are the towns of Cromarty, Invergordon and Dingwall.

CROME, John, English landscape painter: b. Norwich, 22 Dec. 1768; d. there, 22 April 1821. His school education was very scanty, but after some struggle and a long apprenticeship to a sign painter he succeeded in getting established as a drawing-master. He studied the Dutch masters, his favorite being Hobbema, but his distinguishing characteristic is his genuine English realism. He paid great attention to detail, and though this is sometimes exaggerated in his work, there is always a mastery of feeling for light and out-of-doors which give great force and individuality. In 1805 he founded the Norwich Society of Artists, of which he became president as well as chief contributor to its annual exhibitions. Some of his pictures are ‘Household Heath’; ‘View of Chapel Fields, Norwich’; ‘Carrow Abbey’; and ‘Clump of Trees’; the ‘Oak at Poringlane’ (in the National Gallery); the ‘Willow’; ‘Hautbois Common’ (in the Metropolitan Museum); and ‘The Old Oak’ (also in New York). His visit to Paris enabled him to catch the livelier note in his ‘Fishmarket at Boulogne’ and ‘Boulevard des Italiens, Paris’ (Keswick Hall, near Norwich). He excelled in depicting the scenery of his native county, and especially in his handling of trees; and his high place among British landscape painters is now universally acknowledged. He also practised etching with great success. His etchings were published posthumously under the title of ‘Norfolk Picturesque Scenery’ (1834, 1838, 1850). Consult his biography by Turner (Norwich 1838); Wodderspoon (ib. 1858); Hardie, in the *Connoisseur* (London 1904); VanDyck, ‘Old English Masters’ (New York 1902); Dickes, ‘The Norwich School of Painting’ (London 1905); Binyon, ‘J. Crome and J. S. Cotman’ (ib. 1906); Theobald, ‘John Crome's Etchings’ (ib. 1906). He is sometimes called «Old Crome,» to distinguish him from his son, J. Berney Crome, also an artist (q.v.).

CROME, John Berney, English landscape painter: b. Norwich 1794; d. 1842. He was the son and pupil of John Crome (q.v.), and is called «Young Crome,» to distinguish him from his father. In 1819 he became president of the Norwich Society of Artists. His pictures are mostly river and coast scenes of England, France, Holland and Italy. He imitated his father's style so closely that much confusion of authorship has resulted, especially in ‘Yarmouth Water Frolic,’ which was for a long time considered the masterpiece of the elder Crome. Toward the end of his life he painted inferior subjects. Consult Dickes, W. F., ‘The Norwich School of Painting’ (London 1905).

CROMER, Evelyn Baring, 1st Earl, English statesman and diplomatist: b. Cromer Hall, Norfolk, 26 Feb. 1841; d. London, 29 Jan.

1917. He was educated at the Ordnance School, Carshalton, and at the Royal Military Academy of Woolwich. He joined the Royal Artillery in 1858, became aide-de-camp to Sir Henry Storks, high commissioner of the Ionian Islands, in 1861, and acted as secretary during the inquiry into the Jamaica outbreak in 1865. He came to New York in 1864 to study the Civil War, went to the front with the Federal troops and succeeded in reaching the Union lines before Petersburg. He was gazetted captain in 1870, and in 1872 became private secretary to his cousin, Lord Northbrook, viceroy of India, where he remained until 1876, when he was gazetted major and was appointed British commissioner of the Egyptian public debt office. He was mainly responsible for the report of the commission of inquiry of 1878, into the financial methods of the Khedive Ismail, and on the latter's enforced abdication in 1879, Major Baring became British controller-general of Egyptian finances and practical director of the dual control. He was transferred to India in 1880, where he became financial member of the council of the governor-general of India. He remained there till 1883, leaving an unmistakable mark on the financial system of India, and in the same year became British agent and consul-general in Egypt and a minister plenipotentiary in the diplomatic service. He was created first Baron Cromer in 1892, viscount in 1898 and earl in 1901. His record was made in Egypt, where he found the country bankrupt and the people ground down by heavy taxation. He bolstered up the country's credit, reduced taxation to a minimum, removed dishonest officials by the thousand, abolished forced labor, built schools and hospitals and introduced modern sanitation methods. His biggest single work was to build the country's irrigation system, considered for years the model of the world. This greatly increased the country's prosperity, by securing the natives three crops a year. He saw to it that the peasants and small farmers received proportionately the same benefit as the owners of huge estates. He also reformed the army, increased trade and greatly extended railway, postal and telegraph facilities. His efficient administration won for him the title of "Maker of Modern Egypt." He resigned in 1907 because of ill health and received a grant of $250,000 from Parliament in recognition of his services in Egypt. In 1908 he published, in two volumes, 'Modern Egypt,' in which he gave an impartial account of events in Egypt and the Sudan since 1876, and dealt with the results to Egypt of the British occupation of the country. In 1911 he was active in securing Unionist support for the Parliament Bill, so as to prevent the creation of new peers. He wrote several articles on the European War, and in July 1916 was appointed chairman of a commission to investigate the Dardanelles campaign. His publications, besides those already noted, include 'Staff College Essays'; 'Paraphrases and Translations from the Greek'; 'The War Game'; 'Ancient and Modern Imperialism' (1910); 'Political and Literary Essays' (1908–13); 'Abbas II' (1915). See EGYPT.

CROMLECH, krŏm'lĕk, the name given to a kind of ancient sepulchral monument, numbers of which have been found in all parts of the British Islands, as well as on the continent of Europe, in Asia and in America. A cromlech consists of three or more columns of unhewn stone supporting a large tabular block so as to form with it a rectangular chamber, beneath the floor of which is generally found a sepulchral chamber or cist enclosing a skeleton, with arms, stone implements and other ancient relics. Sometimes the cromlech was encircled by a ring of standing stones, as is seen in the case of the Standing-stones of Stennis, in Orkney; and sometimes it was itself buried beneath a large mound of earth. Among the most remarkable cromlechs in England are those known as Kit's Coty House, near Aylesford, in Kent, consisting of three upright stones with a very large flat one above them; the cromlech of Chun Quoit, in Cornwall, the capstone of which is calculated to weigh 20 tons; and two cromlechs standing beside each other at Plas Newydd in Anglesey. Among cromlechs in Scotland we may mention one near Craigmaddie House, Stirlingshire, known as the Auld Wives' Lifts, remarkable for being a complete cromlech consisting of three stones only; and a partially ruined one at Bonnington Mains, near Edinburgh, called the Witch's Stone, the capstone of which measures 11½ feet long and 10½ feet in greatest breadth. The term cromlech is supposed by Prof. Daniel Wilson to be derived from *cromadh* (Gaelic) or *cromen* (Welsh), signifying a roof or vault, and *clach* or *lech*, a stone, and would therefore mean the suspended or vaulted stone. See DOLMEN.

CROMMELIN, krŏm-mĕ-lăṅ', **May de la Cherois,** shā-rwä', Irish novelist: b. in Ireland, the descendant of a Huguenot founder of the Ulster linen trade. She has traveled extensively and is the author of 'Queenie'; 'My Love, She's but a Lassie'; 'A Jewel of a Girl'; 'Miss Daisy Dimity'; 'Orange Lily'; 'Joy'; 'In the West Country'; 'Brown Eyes'; 'Goblin Gold'; 'Violet Vivian, M. F. H.'; 'For the Sake of the Family'; 'Love Knots'; 'Bay Ronald'; 'Dust Before the Wind'; 'Over the Andes'; 'Half Round the World for a Husband'; 'Divil-May-Care'; 'Kinsah'; 'Bettina'; 'The Luck of a Lowland Laddie'; 'A Woman Derelict'; 'Crimson Lilies'; 'Partners Three'; 'The White Lady'; 'Lovers on the Green'; 'Pink Lotus.' Her novels have circulated extensively in the United States.

CROMPTON, Samuel, English inventor: b. Firwood, near Bolton, 3 Dec. 1753; d. Bolton, 26 June 1827. He early displayed a turn for mechanics, and when only 21 years of age invented the machine for spinning cotton which is now constantly associated with his name, and was called a mule, from its combining the principles of Hargreave's spinning jenny and Arkwright's roller-frame, both of which had been invented a few years previously. The mule shared in the odium excited among the Lancashire hand weavers against these machines, and for a time Crompton was obliged to take his invention to pieces and conceal it from view. He afterward refitted it and brought it again into work, but was unfortunately unable to secure a patent for it. Various improvements were introduced from time to time on the mule, but the original principle, as devised by Crompton, remained the same. In 1812 the sum of £5,000 was voted to him by Parliament. This was almost all the remuneration which he ever received for an invention which contributed so essentially to the development of the greatness of Great Britain as a manufacturing nation. Consult French, ‹Life and Times of Crompton› (London 1860).

CROMWELL, Bartlett Jefferson, American naval officer: b. Georgia, 9 Feb. 1840. He was at the Naval Academy 1857–61, and was the first midshipman appointed from Nebraska. He served on the *Quaker City*, and *Conemaugh* with the south Atlantic blockading squadron 1861–63; and with the east Gulf squadron 1863–65. He was commissioned commander 24 Oct. 1874; was inspector of ordnance 1878; on duty at Portsmouth navy yard 1882–85; League Island navy yard 1886–89; and promoted captain in March 1889. At the conclusion of the Spanish-American War he was ordered to Havana to receive the surrender of the naval station there. He became a rear-admiral 3 March 1899. In 1901 he was appointed to the command of the United States fleet in South American waters, and later in the same year to the command of the European station. He retired 9 Feb. 1902, having reached the age limit of 62 years.

CROMWELL, Henry, English soldier: b. Huntingdon, England, 20 Jan. 1628; d. Soham, Cambridgeshire, 23 March 1674. He was the fourth son of Oliver Cromwell, under whom he served as colonel in Ireland in 1649. He sat in Parliament in 1653, and was lord-deputy of Ireland 1655–57 and lord-lieutenant 1657–59, his rule being conservative and popular. His toleration of the Royalists was rewarded by the approval of Charles II and the confirmation of his Irish estates under the Act of Settlement. After 1659 he lived in retirement as a farmer on his estate at Spenway Abbey in Cambridgeshire.

CROMWELL, Oliver, lord-protector of England: b. Huntingdon, 25 April 1599; d. London, 3 Sept. 1658. He was the second son of Robert Cromwell and Elizabeth Steward. His father was a younger son of Sir Henry Cromwell, knighted by Queen Elizabeth; and Sir Henry again was a son of Sir Richard Williams, a nephew of Thomas Cromwell, Earl of Essex, whose name he took. He entered Sidney Sussex College, Cambridge, 23 April 1616, but left on the death of his father in 1617. In 1620, at the age of 21, he married Elizabeth, daughter of Sir James Bourchier, and settled on his estate at Huntingdon. In 1628 he was a member of Parliament for Huntingdon and distinguished himself by his zeal against «popery.» On the dissolution, in 1629, he returned to Huntingdon; in 1631 he went with his family to a grazing-farm he had taken at Saint Ives; and in 1636 to Ely, where he had inherited a property.

The storm was already at hand which was to shake England to its foundations. The arbitrary measures of Charles I were so stoutly resisted that he endeavored to rule without a Parliament; but at length the king was compelled, by the state of affairs in Scotland, to summon a Parliament (1640). Cromwell, now a member for Cambridge, and others were so loud in their complaints of abuses in Church and state that Charles prorogued the Parliament, but six months after was obliged to reassemble it. In this Parliament, called the Long Parliament (from November 1640 to April 1653), Cromwell first attracted notice chiefly by his rustic and slovenly dress and by the vehemence of his oratory.

On the breaking out of the great Civil War in 1642, being appointed captain, he raised a troop of horse (the «Ironsides») composed of zealous Puritans. He was present at Edgehill (23 Oct. 1642); his first military exploit was to capture the magazine of Cambridge along with the university plate. He then routed the Royalists and made himself master of their supplies. He laid the foundation of his military fame by the relief of Gainsborough (28 July 1643), and in October 1643 he was assailed by a greatly superior Royalist force at Winceby, but defeated it. In this action he had a horse killed under him, and was himself struck down while in the act of rising. On 2 July 1644 the battle of Marston Moor was gained by the parliamentary army — a result mainly brought about by Cromwell and his Ironsides. His rigorous discipline of his regiment of Ironsides was designed to fit «men of religion to oppose men of honour.» Cromwell also bore a distinguished part in the second battle of Newbury (27 Oct. 1644) under the Earl of Manchester.

The Independent party, led by Cromwell and his friends, were for pursuing the war with the utmost vigor, and in order that they might have their way determined to get the entire control of the army. In order to accomplish this, they procured the passing of the Self-denying Ordinance, prohibiting members of either house of Parliament from holding any military command on the ground that vices and corruptions had crept into the army, that it required to be remodeled and a stricter discipline maintained. Thomas Fairfax was made lord-general in place of Essex, while Cromwell was placed under him, with the rank of lieutenant-general. Cromwell now introduced into the whole army the excellent discipline in which he had already trained a part of it, and gained the decisive battle of Naseby (14 June 1645), in which the king was routed with great loss. The spirit in the army, which the officers, and especially Cromwell, excited by their sermons and prayers, had now risen to fanaticism; though at the same time good order and morality were so well maintained that profanity, drunkenness, robbery, and the like offenses, hardly ever occurred. After Naseby no time was lost by the parliamentary leaders in following up their success. Leicester was retaken, Taunton relieved, Bridgewater stormed, Bristol, held by Prince Rupert, was besieged and surrendered, Devizes was stormed, Winchester surrendered, Dartmouth was stormed, and finally Sir Jacob Astley was defeated at Stow-on-the-Wold, 21 March 1646.

The Royalists were completely crushed. Charles took refuge with the Scottish army (5 May 1646), but was soon given up by them to the Parliament, on which occasion Cromwell was one of the commissioners. When Parliament, in which the Presbyterian element predominated, wished to disband the army, the soldiers, headed by the Independents, appointed a council of officers and a body of subalterns and privates called Adjutators (misspelt agitators), who declared to the Parliament that they would not lay down their arms till the freedom of the nation was established. Some of the soldiers conducted themselves so boldly that Parliament ordered their arrest; on which occasion Cromwell not not only supported the House, but deplored the seditious temper of the troops, which he said had even put his own life in danger. Cromwell seems at this time to have contemplated the restoration of the king, and, supported by Fairfax and others, even entered into a treaty with him; but he soon discovered that Charles was not to be trusted and that the king's success would be his destruction. Fighting now took place with the Royalist party in Wales, but Cromwell soon finished the struggle in this quarter; after which he proceeded against the Scots, who had raised a strong army "to deliver the king from sectaries." As Fairfax, from Presbyterian scruples, declined the command of the expedition against Scotland, Cromwell undertook it. With a much inferior force he defeated the Scots in a three days' action at Preston (17-19 Aug. 1648) and marched on to Edinburgh.

Now followed the tragedy of the king's execution, 29 Jan. 1649. Cromwell's name stood third in order in the death-warrant, and though he may have been impelled to the step by force of circumstances and by his knowledge of the king's faithlessness, there is no reason to suppose that he regretted the share he took in the death of the king, or thought that he was unjustly punished. Affairs in Ireland now demanded his presence, and having been appointed lord-lieutenant and commander-in-chief, he joined the troops there in August 1649. He took Drogheda by storm (September 1649), where he gave orders that nothing should be spared. Most of the cities opened their gates without resistance, and within six months the Royalist party in Ireland was wholly crushed.

Resigning the command to Ireton, he now undertook, at the request of the Parliament, a similar expedition against Scotland, where Prince Charles, afterward Charles II, had been proclaimed king. The victory at Dunbar, 3 Sept, 1650, rid Cromwell of the menace in that direction. Meanwhile, however, Prince Charles had collected new forces; but Cromwell, by skilful marches near Stirling, cut him off from his points of support, when, contrary to his expectation, the prince entered England and threatened the metropolis itself. Cromwell hastened from the Scottish troops into England. Charles was totally defeated at Worcester, 3 Sept. 1651, and this victory, which Cromwell called the crowning mercy of God, gave the commonwealth party full power over the three nations.

Cromwell already exerted a weighty influence on the supreme direction of public affairs. He succeeded in restoring the continental relations of England, which had been almost entirely dissolved, and regulated them so as to promote the interests of commerce. The Navigation Act, from which may be dated the rise of the naval power of England, was framed upon his suggestion and passed in 1651. Meanwhile the Long Parliament, aiming to establish its own power, was growing more and more unpopular in consequence of its undisguised tyranny, the war which it had provoked with the Dutch and its treatment of the prisoners taken at Worcester, some of whom were put to death in prison and others sold for slaves in the colonies. Cromwell now spoke openly to his friends of the ambition, the godlessness and injustice of the Parliament. Encouraged by their support, he, with five or six files of soldiers, dispersed that body 20 April 1653. He then summoned a council of state consisting mainly of his principal officers, which finally chose a Parliament of persons selected from the three kingdoms, which, from Praise-God Barebone or Barbone, one of the principal characters in it, by trade a leather seller, was nicknamed Praise-God Barebone's Parliament, another name being the Little Parliament. Cromwell opened the session with a speech, in which he said that the day was come on which the saints were to commence their reign upon earth. Fifteen months after, a new annual Parliament was chosen; but after five months Cromwell prevailed on this body to place the charge of the commonwealth in his hands. The chief power now devolving again upon the council of officers (12 Dec. 1653), they declared Oliver Cromwell sole governor of the commonwealth, under the title of lord-protector.

The new protector behaved with dignity and firmness. With the aid of General Lambert he formed a constitution called the Instrument of Government, by which the Protector with his council was invested with the power of peace and war, and was to summon a Parliament once every three years; the supreme legislative authority was declared to be and to reside in the lord-protector and Parliament; all commissions, patents, writs, processes, etc., were to run in the name of the lord-protector; all the forces of the kingdom were to be under the protector and Parliament during the sitting of the latter, but in the intervals of Parliament, under him and his council alone. In case of his death the council were immediately to choose a new protector; but no protector after him was to command the army. Cromwell treated Ireland with great severity. Apart from that, his political administration was masterly and adapted to the circumstances of his situation. He established large magazines of provisions; the pay of the soldiers was regularly delivered to them a month in advance; yet the public revenues were strictly and economically managed, without any additional imposts. He appointed for judges the most upright and distinguished men. He never interfered with the proceedings of the courts of justice. Every man had liberty of conscience — a principle for which the protector was a lifelong contender. In other things, too, Cromwell, as his own correct judgment prompted, would have governed with mildness and justice, and promoted the arts and sciences, but was obliged to maintain his power, as he had acquired it, by a severity often amounting to tyranny. He cultivated the friendliest relations with the Protestant powers, Holland, Sweden and Denmark, and concluded an advantageous commercial treaty with Portugal. The skilful and fortunate conduct of the war with Spain, from 1655 to 1658, in which Jamaica and Dunkirk were taken, made the new Parliament, from which Cromwell had carefully excluded all Republicans, so obsequious, that they at last offered him the title of king. Some individuals opposed the measure so resolutely that Cromwell, fearing the fate of Cæsar, declined the title. Parliament gave him the title of "Highness," and the right of appointing his successor; and he was a second time solemnly invested by the Speaker with the ensigns of his office (26 June 1657). He died at Whitehall, whither he had been brought from his favorite residence, Hampton Court, and was buried in King Henry VII's Chapel, in Westminster Abbey. Most of the European courts went into mourning for him, even that of Versailles. After the Restoration his body was taken up and hanged at Tyburn, the head being fixed on a pole at Westminster Abbey, and the rest of the remains buried under the gallows.

Cromwell was great as a soldier — one of the greatest leaders of cavalry in history; his "crowning mercy" at Worcester has been regarded as the prototype of Sedan; but he was greater as a statesman and civil administrator. His task after his elevation to the protectorate was one of unexampled difficulty. Beset on the one hand by royalist plotters and on the other by republican revolutionaries, he who had humbled and stamped out one tyranny was, by the ironical pressure of events, impelled to set up a more complete absolutism in its place. His foreign policy redounded to the glory of England. "His greatness at home," said Clarendon, "was a mere shadow of his greatness abroad." Even in the England drunk with the excesses of the Restoration this side of his rule was remembered. "It is strange," records Pepys in his diary, eight years after Cromwell's death, "how everyone do nowadays reflect upon Oliver and commend him, what brave things he did, and made all the neighbour princes fear him."

In his personal habits, Cromwell was abstemious, temperate, indefatigably industrious and exact in his official duties. His exterior inspired neither love nor confidence; his figure had neither dignity nor grace; his voice was harsh; in his public speeches he expressed himself with force and fire, but without method or taste. On the other hand, he possessed extraordinary penetration and knowledge of human nature; no one knew so well as he the art of winning men and using them to his purposes. He devised the boldest plans with a quickness equaled only by the decision and intrepidity with which he executed them. No obstacle deterred him; and he was never at a loss for expedients. Cool and reserved, but full of great projects, he patiently waited for the favorable moment, and failed not to make use of it. In his religious views he was an upright and tolerant Calvinist. In his family life he was irreproachable.

Bibliography.— Carlyle, 'Letters and Speeches of Oliver Cromwell' (1845); Foster, 'Statesmen of the Commonwealth' (1840); Guizot, 'Life of Cromwell' (1851); Gardiner, 'The Great Civil War' (1893); 'Constitutional Documents of the Puritan Revolution' (1899); 'History of the Commonwealth and Protectorate' (1894–1901); 'Cromwell's Place in History' (1897), and 'Oliver Cromwell' (1901); Harrison, 'Oliver Cromwell' (1888); Firth, 'Oliver Cromwell and the Rule of the Puritans in England' (1900) and 'The Last Four Years of the Protectorate' (1909); Johnstone, 'Oliver Cromwell' (1912); Marshall, 'Through Great Britain and Ireland with Cromwell' (New York 1912); Morley, 'Oliver Cromwell' (1900); Roosevelt, 'Oliver Cromwell' (1900).

GEORGE EDWIN RINES.

CROMWELL, Oliver, English biographer: b. 1742; d. Cheshunt, Hertfordshire, 31 May 1821. He was the great-grandson of Henry Cromwell, son of the protector, and the last of his known descendants. He succeeded to the estate of "Theobalds," which descended to him through the children of Richard Cromwell, eldest son of the protector. He wrote the 'Memoirs of the Protector, Oliver Cromwell, and his Sons, Richard and Henry, illustrated by Original Letters and other Family Papers' (1820).

CROMWELL, Richard, lord-protector of England: b. Huntingdon, 4 Oct. 1626; d. Cheshunt, Hertfordshire, 12 July 1712. He was the third son of Oliver Cromwell, and by the deaths of his two older brothers, Robert and Oliver, became his father's heir. He was amiable and popular but weak, devoted to field sports and fond of pleasure. He lived for some time in comparative privacy, and was called to succeed his father in the protectorate in September 1658. Scarcely had he entered on his office, when the forces of anarchy, both parliamentary and military, broke loose, and he found himself utterly unable to restrain them. It was probably with little reluctance that he quitted Whitehall in April 1659, and retired into private life. After the Restoration he lived for a time abroad under the name of Clark, but he returned to England about 1680, passed the remainder of his life at Cheshunt, and was buried in the church at Hursley, Hampshire.

CROMWELL, Thomas, EARL OF SUSSEX, English statesman; b. Putney, Surrey, about 1485; d. 28 July 1540. In his youth he went to the Continent, and was successively common soldier, clerk and trader. In 1514 Wolsey made him collector of the revenues of his see of York, and nine years later he entered Parliament, where his ability soon attracted attention. In 1524 he became a member of Gray's Inn, and Wolsey now employed him in the work of suppressing the smaller monasteries. On his master's disgrace in 1529 Cromwell defended him with great spirit in the House of Commons, and effectually opposed the articles of treason brought against Wolsey. After the cardinal's death Cromwell was taken into the king's service. He was the ready instrument in compassing the royal purposes, by the establishment of the royal supremacy in spiritual things, humbling the power of the nobles, and thus making the king an absolute monarch. Honors rained upon him. He was knighted and made a privy councillor; in 1533 he was appointed Chancellor of the Exchequer, and 1534 king's secretary and Master of the Rolls. On the abolition of the Pope's supremacy in 1534 he was created king's vicar-general, and used all his influence to promote the reformation. In 1535 he was commissioned to hold a general visitation of all the monasteries in England, in order to suppress them. In this office he acted with great severity and injustice. He became lord-keeper of the privy seal and was elevated to the House of Lords with the title of Baron Cromwell of Oakham. In 1539 he became lord high chamberlain, and the following year Earl of Essex. He at length fell into disgrace with the king for the part he took in promoting his marriage with Anne of Cleves. Her person proved disagreeable to

Henry, who fell in love with Catherine Howard, and partly in consequence Cromwell was arrested at the council table on a charge of treason, committed to the Tower, and a bill of attainder — his own favorite engine of tyranny — was passed against him. After piteous appeals for mercy, which were disregarded by the king, Cromwell was beheaded on Tower Hill, declaring that he died in the faith of the Catholic Church.

Owing to the rigorous suppression of the monasteries, Cromwell has been called «Malleus monachorum,» «the hammer of the monks.» The Protestant reformation in England was greatly advanced by him; the Church of England as a state-controlled institution has continued to exist much as he left it. He ordered that a copy of the Bible should be placed in every church, and an edition of the Bible is named after him. One of his enactments, for which posterity owes him gratitude, was that parish registers of marriages, births and deaths should be regularly kept. Cromwell is not without his apologists — the chief of whom is Froude; his persecutions, which involved men like Sir Thomas More and Bishop Fisher, were undertaken from no religious motive, but like all his measures, from a desire to retain the king's favor as a means to his own aggrandizement. Consult Drayton, 'Historie of the Life and Death of Lord Cromwell' (1609); Gairdner, J., 'The English Church in the 16th Century' (London 1902); Merriman, 'Life and Letters of Thomas Cromwell' (1902).

CRONJE, krŏn'yĕ, **Pietrus Arnoldus**, Boer military commander: b. near Pretoria 1835; d. 4 Feb. 1911. He was prominent in all the history of the South African republic. Bred to farm life, he entered politics, refused office after the British annexation in 1877, commanded at the siege of Potchefstroom, became a member of the Transvaal executive government, and forced the surrender of Sir John Willoughby's forces after the Jameson raid in 1896. During the great war with England Cronje was appointed to the command in the western theatre of war, and laid siege to Kimberley. He opposed the British column under Lord Methuen, on whom he inflicted a severe defeat at Magersfontein. After the relief of Kimberley he was surrounded at Paardeberg in the Orange Free State, and after a stubborn resistance with an inferior force surrendered to Lord Roberts, 27 Feb. 1900. He was sent as a prisoner of war to Saint Helena, returning to the Transvaal on the conclusion of peace. He visited the United States in 1905.

CRONSTADT. See Kronstadt.

CRONUS, krō'nus, in ancient Greek mythology, a son of Uranus and Ge (Heaven and Earth), and youngest of the Titans. He received the government of the world after Uranus was deprived of it, and was in turn deposed by Zeus. Cronus was considered by the Romans as identical with their Saturnus. See Saturn.

CROOK, George, American military officer: b. near Dayton, Ohio, 8 Sept. 1828; d. Chicago, Ill., 1 March 1890. He was graduated at West Point in 1852, and rose to the rank of major-general. In the Civil War he greatly distinguished himself at South Mountain, Antietam, Chickamauga and Appomattox, and after the war achieved celebrity in campaigns against the Indians as commander of the districts of Idaho and Arizona. From 1888 until his death he commanded the military division of the Missouri.

CROOK, Isaac, American clergyman and educator: b. Crossenville, Ohio, 10 Dec. 1833. In 1859 he was graduated from Ohio Wesleyan University, and, having been ordained in 1864 to the Methodist Episcopal ministry, he held pastorates in Ohio, Illinois, Michigan, Minnesota and Kentucky. He was president of the University of the Pacific in 1891–92 and of Ohio University in 1896–98, and chancellor of Nebraska Wesleyan University in 1892–96. After serving four years as pastor at Ironton, Ohio, he was presiding elder of the Chillicothe district from 1902 to 1908. He has published 'Character Sketch of Hon. C. C. White, of Crete, Nebraska' (1896); 'Life of Jonathan Edwards' (1903); 'John Knox, the Scotch and Scotch-Irish' (1905); 'Earnest Expectation' (1905); 'The Great Five' (1907); and numerous contributions to newspapers and magazines.

CROOKED ISLAND, one of the Bahamas, in lat. 22° 15′ N., long. 74° W. Area about 176 square miles. The chief product is salt. Pop. 1,541.

CROOKED LAKE. See Keuka Lake.

CROOKER, Joseph Henry, American Unitarian clergyman: b. Foxcroft, Me., 8 Dec. 1850. He was graduated at Ypsilanti (Mich.) Union Seminary in 1870, and was a Baptist pastor for five years, when he entered the Unitarian ministry. He has received the following honorary degrees: S.T.D. Saint Lawrence University, 1900; D.D. University of Nashville, 1901. He was very successful as a pastor at Madison, Wis., 1881–91; Helena, Mont., 1891–97; and Ann Arbor, Mich., 1897; Roslindale Unitarian Church, Boston, Mass., 1905–12; Redlands, Cal., 1912–13. Called to London in 1903 to preach the anniversary sermon before the British and Foreign Unitarian Association he gave an address that year at Amsterdam, Holland, before the International Liberal Congress. In 1914 he was called abroad to preach and lecture in London, Cambridge, Oxford and Liverpool. Among his publications are 'Jesus Brought Back' (1889); 'Different New Testament Views of Jesus' (1890); 'The New Bible and Its New Uses' (1893); Growth of Christianity' (1897); 'Plea for Sincerity' (1898); 'Problems in American Society' (1899); 'The Supremacy of Kindness' (1899); 'The Menace to America' (1900); 'Religious Freedom in American Education' (1903); 'The Supremacy of Jesus' (1904); 'The Church of To-day' (1908) — issued simultaneously by three denominations; 'The Church of To-morrow' (1911); 'Shall I Drink?' (1914). 'The Unitarian Church' (1902), has had a circulation of over 100,000 copies; it was reprinted in Great Britain, and translated into Hungarian, Finnish and Japanese.

CROOKES, Sir William, English electrician and chemist: b. London 1832. In 1854 he became superintendent of the meteorological section of the Radcliffe Observatory, Oxford, and in the following year was chosen professor of chemistry at the Chester Training College.

In 1859 he founded the *Chemical News*. In 1863 the Royal Society elected him a Fellow, and since then many scientific bodies have conferred distinctions on him. He was knighted in 1897, and presided over the 1898 meeting of the British Association at Bristol. Professor Crookes has made his name famous by his important researches and inventions in connection with molecular physics, radiant matter and high vacua. One of his earliest works was 'Select Methods of Chemical Analysis' (1871). He has since published works on such widely separated subjects as sanitation, spiritualism, beet-root-sugar manufacture, dyeing and calico printing, besides translations on chemistry. In 1907 he was awarded the Nobel prize in chemistry jointly with Edouard Buchner of Germany; and in 1910 the Order of Merit was conferred on him.

CROOKES TUBE, a tube containing a gas at very low pressure, such as was used by Sir William Crookes (q.v.; then not yet knighted) in his researches on electrical discharges in high vacua about 1875, and such as is nowadays employed in the production of X-rays. In its present form it consists of a glass bulb with a tube for exhausting it, sealed when the vacuum has attained the desired point, one or more concave cathodes, a target of platinum set obliquely at the focus of the cathode or cathodes, a ring-shaped anode between each cathode and its target. See ELECTRON; ETHER; MOLECULAR THEORY; RADIATION; X-RAYS.

CROOKSTON, Minn., city and county-seat of Polk County, on Red Lake River, and on the Great Northern and Northern Pacific railroads, 300 miles northwest of Saint Paul. Crookston was first settled in 1877 by Colonel Crooks, became a borough in 1880 and a city in 1882. It is a commercial centre of a fertile agricultural region and carries on a large business in lumber, wheat and live stock. It manufactures lumber, farm machinery, gas engines, castings, sashes and doors, leather goods, furniture, wagons, biscuits, etc. It has four banks, with a combined capital of $225,000, and an annual business of $10,000,000. The city has a fine courthouse and municipal buildings, two Roman Catholic and 12 Protestant churches, a fine high school, two large business colleges, a gymnasium and a public library. The city government is administered under a charter which provides for a mayor and a council of 11 members, elected annually. Pop. 7,559.

CROP, a term coming to be widely used, particularly in the oil fields of Oklahoma, as the equivalent of the term outcrop.

CROPS. See AGRICULTURAL CHEMISTRY; FARM CROPS; IRRIGATION.

CROPSEY, Jasper Francis, American artist: b. Rossville, N. Y., 18 Feb. 1823; d. Hastings, N. Y., 22 June 1900. At first he studied architecture but he abandoned this in order to study painting, and in 1847 visited Italy. He finally devoted himself to landscape painting, and his third picture, a view of Greenwood Lake in New Jersey, procured his election as an associate of the American Academy of Design, of which in 1850 he became a full member. He belonged to the so-called "Hudson River School" and painted mostly views of local scenery and English views of similar type. In 1847 ill health compelled him to visit Europe, where he spent three years in close study of his art. Among his most successful productions after his return to America were the 'Sibyl's Temple'; 'American Harvesting'; 'Peace'; 'War'; and 'Niagara Falls' (Brooklyn Museum.) Consult Isham, 'History of American Painting' (New York 1905).

CROQUET, krŏ-kā', to the most scientific form of which the name ROQUE is given in America, an open-air game played with balls, mallets and arches, either upon a closely mowed lawn or a specially prepared court. The game is substantially a revival of the old game of pall mall, which gave its name to the well-known London street. France introduced this game into Ireland and thence into England early in the 17th century, and during the 18th century it was largely neglected, but came again into favor about 1850 and was later superseded in popularity by tennis. When first introduced into the United States croquet was a simple game destitute of all opportunity for skill, but it has so developed that it is now considered by experts to be as scientific as billiards. The court upon which the most improved form of this game is now played has a hard rolled and lightly sanded surface composed of either loam or clay, the nature of this material being determined by the character of the native soil upon which the ground is built. The regulation size for the court is 36 feet by 72 feet, the angles of the rectangle being cut off by eight-foot corner pieces. This space is enclosed by heavy timbers 4 x 6 inches, which are securely spiked together about the ground and which not only serve to confine the balls to the court, but are invaluable in driving the balls to some desired position in another part of the ground, and are of even more value in making carom shots as on a billiard table. A player frequently finds his ball in such a position upon commencing his turn of play that he has not a straight shot for either ball or his arch, and at such times a carom shot is resorted to to strike or capture one of the wired balls. In order to facilitate carom or bank shots and to ensure as great accuracy as possible, use is made of rubber cushions similar to those used upon billiard tables, fitted to the inside of the border timbers, so that surprising accuracy in making caroms is attained. The balls used upon these courts are made of the finest quality of vulcanized rubber and are somewhat expensive. These are very carefully made and must conform to a regulation size of three and one-quarter inches. The wickets, 10 in number, are made of three-eighths or seven-sixteenths inch finest steel rod and are arched at the top, so as to leave, when bent, a distance between wires of three and one-half inches in all of the arches except the centre or "cage," as it is called, where only three and three-eighths inches is left. It can readily be seen that a ball having a diameter of three and one-quarter inches must be almost directly in front of, and in close proximity to, a wicket of three and one-half or three and three-eighths inches in width in order to successfully pass through. To ensure rigidity and to prevent spreading, the wickets after they are bent are driven into heavy wooden blocks 4 x 8 x 18 inches, across the top of which steel plates, properly drilled to fit the arches, have been bolted. The blocks are then buried under the ground, so that the arch stands between eight and nine inches above the surface. The stakes, which are located at the starting and turning points in the game, are one and one-half inches high and one inch in diameter. The mallets, which range in price from $5 to $20, are very carefully made, usually to order. Their dimensions and weights vary according to individual taste, but the average sizes are: length of handle, 10 inches; length of head, 7½ inches; diameter of head, 2 or 2¼ inches. The average weight is about two pounds. The ends or faces of the mallet heads are protected by heavy steel or brass ferules, and the faces themselves are made of either ivory or vulcanized rubber, in the one end, and soft rubber in the other, the latter being used for making certain shots which are impossible with the hard end.

While the old game croquet was, and, in fact, is still played by any number of persons up to eight, roque as played to-day contemplates the participation of but two players in a game, each of whom uses two balls, playing them as partners against the opposing two of the adversary. The object of the game is to play by stroke of the mallet through all of the arches, with both balls in order, by any number of turns or plays, and finally putting both partner balls out by making them strike successively the home stake. The player who succeeds in doing this first is the winner. While advancement of one's own balls is of course of primary importance, hardly less important is the ability to retard the progress of one's opponent. This is often done by shooting the next playing ball into or behind an arch, so that upon the opponent's beginning his turn, but little chance for him to advance presents itself.

Croquet tournaments are held at stated intervals at Wimbledon, England, and attract considerable attention in that country, but although challenges have been sent to the United States by some of the representative players of England, international matches have never been arranged, owing largely to the difficulty of unifying certain differences in play. The greatest of these is possibly the fact that the Englishmen play upon grass, while in the United States all championships are contested for upon dirt or clay courts.

The principal clubs of the United States are federated into the National Roque Association of America, which was organized in New York in 1882, under the name of the National American Croquet Association, which name was subsequently changed to the present one. The headquarters of the association are at Norwich, Conn., where there are first-class courts and a spacious and attractive club-house, in which on the Tuesday following the third Monday in August the association holds its annual meetings. During the remainder of the week the annual championship contests are held to determine the champion for the next year. There are more than two dozen clubs comprising the National Association. The rules for the game will be found in the 'Official Roque Guide,' Group xi, No. 271, of Spalding's Athletic Library (New York, annually), and in which a plan of the court is reproduced. See also Lillie, 'Croquet Up-to-Date' (New York 1900).

CROSBY, Frances Jane Van Alstyne, American hymn writer: b. Southeast, N. Y., 24 March 1820; d. Bridgeport, Conn., 12 Feb. 1915. She became blind at the age of six months; entered the New York Institute for the Blind 1839, and was a teacher of English and history there 1847–58, when she married Alexander Van Alstyne, a blind music teacher. She has written more than 3,000 hymns, many of which have become perennially popular, and powerful aids in evangelistic work. Publications: 'The Blind Girl, and Other Poems' (1844); 'Monterey, and Other Poems' (1849); 'A Wreath of Columbia's Flowers' (1858); 'Bells at Evening, and Other Poems' (1898). Of her hymns perhaps the best known are 'Safe in the Arms of Jesus,' and 'Jesus the Water of Life Will Give.' Most of the popular ones are included in Moody and Sankey's 'Gospel Hymns,' and Sankey's 'Sacred Songs and Solos.' Among her songs may be mentioned 'There's Music in the Air' and 'Hazel Dell.' Consult her 'Memoirs of Eighty Years' (1906).

CROSBY, Howard, American Presbyterian clergyman and scholar: b. New York, 27 Feb. 1826; d. there, 29 March 1891. He was graduated at the University of the City of New York in 1844, and six years later became professor of Greek there and subsequently held the same chair in Rutgers College. In 1863 he was made pastor of the Fourth Avenue Presbyterian Church in New York and thereafter was frequently a delegate to the Presbyterian General Assembly and was once its moderator. He was chancellor of the University of New York 1870–81, and a member of the American committee of revisers of the New Testament. He published 'Lands of the Moslem' (1850); an edition of the 'Œdipus Tyrannus' (1851); 'Life of Jesus' (1871); 'Commentary on the New Testament' (1885); 'Bible View of the Jewish Church' (1888); 'The Seven Churches of Asia' (1890), and other biblical criticisms.

CROSBY, John Schuyler, American soldier: b. Watervliet, Albany County, N. Y., 19 Sept. 1839; d. 1914. He was a lineal descendant of the Schuylers of the Revolutionary period. He was graduated at New York University and was appointed second lieutenant of the First Artillery in 1861. He was personal aide-de-camp to Gen. Phil Sheridan for five years during and following the Civil War, and was brevetted several times for gallantry in getting dispatches through to Admiral Farragut and others, retiring from the army in 1871 as colonel. He became adjutant-general of the expeditions against hostile Indians by Generals Sheridan, Custer and others, and did much for peace in the disturbed West, representing the government in many conferences with Indians. In 1876 he was awarded a gold medal by Congress for saving life at sea. He was appointed consul at Florence, Italy, that same year, was territorial governor of Montana 1881–83, and first assistant postmaster-general of the United States 1883–85. He also served as school commissioner of the city of New York.

CROSBY, Peirce, American naval officer: b. near Chester, Pa., 16 Jan. 1823; d. Washington, D. C., 15 June 1899. He entered the navy as midshipman in 1838, and during the Mexican War served on the *Decatur* and *Petrel*. In the spring and summer of 1861 he served in Chesapeake Bay. The next year he commanded the gunboat *Pinola* and joining Farragut's Gulf squadron, co-operated with the *Itasca* in breaking through the chain barrier across the Mississippi at forts Jackson and Saint Philip; participated in the capture of New Orleans, and in the bombardment, passage and repassage of the Vicksburg batteries; commanded the *Metacomet* (1864–65), blockading Galveston, Tex., and participated in the attack on Mobile. After the war he was commandant at various navy yards; became commodore in 1874, and rear-admiral in 1882. He commanded the south Atlantic station in 1882 and Asiatic station 1883, and was retired at his own request in October 1883.

CROSBY, William Otis, American geologist: b. Decatur, Washington County, Ohio, 14 Jan. 1850. He was graduated at the Massachusetts Institute of Technology in 1876, with the degree of B. Sc., and was a member of its faculty from 1877 to 1907, when he retired. He is consulting geologist of the Metropolitan Water Board of Massachusetts and of the New York board of water supply, and of the United States Reclamation Service. He has made investigations in connection with engineering projects in the United States, Mexico, Alaska and Spain. He is chiefly engaged at present in original research, is a Fellow of the American Academy of Arts and Sciences, of the Geological Society of America, the Seismological Society of America; member of the American Institute of Mining Engineers and the Boston Society of Natural History. His publications include 'Contributions to the Geology of Eastern Massachusetts' (1880); 'Common Minerals and Rocks' (1881); 'Guide to Mineralogy' (1886); 'Tables for the Determination of Common Minerals' (1887); 'Guide to Dynamical Geology and Petrography' (1892); 'Geology of the Boston Basin' (1893–94); also more than 100 other contributions to geologic literature.

CROSIER, the pastoral staff of a bishop, symbol of his authority over his flock and of his guard over them to save them from ravage by the wolves. It is curved or crooked at the top and pointed at the lower end; and a mediæval hexameter verse indicates the significations of the staff, its crook and its sharpened lower end: *Curva trahit quos dextra regit, pars ultima pungit* — the crooked end gathers in (the lambs or sheep) that the right hand with the staff guides, the lowest part pierces — kills the wolf. The bishop of Rome alone of all bishops bears no crosier. Another and earlier form was the "tau" or "T," giving the shape of a small cross, a symbol of the bishop's authority. The tau often ended in the head of a lion as an emblem of power; the crook often impales a serpent or a dragon, symbol of the triumph over evil. Abbots were privileged to carry the crosier as early as the 5th century. The "pannisellum" or silk veil hanging to the staff has long disappeared from those of bishops. Consult Barrand and Martin, 'Le bâton pastoral' (Paris 1856); Lind, 'Über den Krummstab' (Vienna 1863).

CROSMAN, Henrietta, American actress: b. Wheeling, W. Va., 2 Sept. 1870. In 1897 she was married to Maurice Campbell. She went on the stage in 1889, in Bartley Campbell's 'White Slave' Company, she was a member of Augustin Daly's company in 1890, and in 1892–94 was Charles Frohman's leading woman. Her career as a star began under the management of her husband, Maurice Campbell, in Bronson Howard's 'One of Our Girls'; and on 9 Oct. 1900 she produced Hazleton's 'Mistress Nell' at the New York Bijou Theatre, where it ran for over 100 performances. She appeared as Rosalind in 'As You Like It' in 1902, which ran for eight weeks at the Republic Theatre, New York. After this she appeared in many popular successes, including 'The Sword of the King' (1902); 'Sweet Kitty Bellairs' (1903); 'All-of-a-Sudden Peggy' (1906–07); 'Sham' (1909); 'Anti-Matrimony' (1910); 'The Real Thing' (1912).

CROSS, Charles Robert, American physicist: b. Troy, N. Y., 29 March 1848. He was graduated at the Massachusetts Institute of Technology 1870, became an instructor in its physical department, from 1876 Thayer professor of physics, and from 1877 director of the Rogers laboratory. In 1882, at his instance, the institute established the first course leading to a degree in electrical engineering in this country and one of the first in the world, of which he was in charge for 20 years. Most of his scientific papers have been published in the *Proceedings* of the American Academy of Arts and Sciences. He is the author of the textbooks 'Course in Elementary Physics' (1873); and 'Lecture Notes on Mechanics and Optics' (1884); 'Notes on Mechanics' (1911).

CROSS, (Charles) Whitman, American geologist: b. Amherst, Mass., 1 Sept. 1854. He was educated at Amherst College and at the University of Leipzig. In the United States Geological Survey he was assistant geologist in 1880–88, geologist after 1888, and chief of the section on petrology in 1903–06. In 1911 he became treasurer of the National Academy of Sciences. He is author, with three others, of the important 'Quantitative Classification of Igneous Rocks' (1903), a new system with new nomenclature. He also prepared a number of geological survey bulletins and in 1902 published 'The Development of Systematic Petrography in the Nineteenth Century.' He is a member of the Geological Society of America.

CROSS, Mrs. George Frederick, Australian novelist. See CAMBRIDGE, ADA.

CROSS, Mary Ann Evans. See ELIOT, GEORGE.

CROSS, Wilbur Lucius, American educator: b. Mansfield, Conn., 10 April 1862. He was graduated at Yale 1885; was instructor in English in the Sheffield Scientific School 1894–97; and has been professor there from 1897. He has published 'Development of the English Novel' (1899), and Life and Times of Laurence Sterne' (1909), besides an edition of Sterne's works (1904), and editions of 'Macbeth' (1900), 'Silas Marner' (1903), Stephenson's 'Travels with a Donkey' (1909), and 'Robinson Crusoe' (1911). Since 1911, he has been editor of *The Yale Review*, which under his editorship at once took a high place among contemporary periodicals. He is also a contributor of literary criticisms to various magazines.

CROSS, a common instrument of capital punishment among the ancients; esteemed so dishonorable that only slaves and malefactors of the lowest class were subjected to it by the Romans. It was customary to proclaim the name and offense of the person crucified, or to affix a tablet (*album*) to the cross on which they were inscribed. Malefactors were sometimes fastened on a simple upright stake, and so left to die, or they were impaled upon it, but very generally a cross-piece was added to the stake, to which the arms of the criminal were tied, or to which his hands were nailed. The cross was erected outside the gates of towns, but in places of frequent resort. The person crucified often lived for days upon the cross. The death of Christ by crucifixion led Christians to regard the cross with peculiar feelings of reverence. From the early days of the Church it was a usual emblem of Christian faith and hope, and the first Christians were wont to show great respect to its representations, with Saint Paul «glorying in the cross of our Lord Jesus Christ.» The gestural sign of the cross was in general use among them, so that in the 2d century Tertullian writes: «At every step and movement, when we go in or out, when we dress or put on our shoes, at the bath, at the table, when the lights are brought, when we go to bed, when we sit down, whatever it is that occupies us, we mark the forehead with the sign of the cross.» He tells us that the Christians were reproached with worshipping the cross. In the Catholic Church blessings and benedictions are always accompanied with the sign of the cross. The Church has an annual festival commemorative of the finding by Saint Helena, mother of Constantine, of the cross upon which Christ died. Another festival is that of the Exaltation of the Cross, to commemorate a miraculous appearance of a cross in the heavens in 317 at the moment when Constantine was ordering his army for an attack on that of his rival, the Emperor Maxentius. On Good Friday is practised the usage of the «Adoration of the Cross,» when the faithful humbly and reverently by kissing the crucifix express their devotion and gratitude to the author of their redemption. In church processions the cross or the crucifix is always borne in the forefront, its bearer, the crucifer, having on his right and left an acolyte bearing a lighted torch or candles. See Crosses and Crucifixes and consult the authorities there referred to.

CROSS, The Southern. See Orders, Royal, and Decorations of Honor — Brazil.

CROSS, Victoria. See Victoria Cross.

CROSS-EXAMINATION, the questioning of a witness by the party or the counsel of the party against whom he has been called to testify. The object is to test the correctness of the testimony given. For this reason, the inquiry is limited to matters drawn out on the direct examination of witnesses. Leading questions are permitted in cross, but not in direct, examination. The questions asked in cross-examination must be confined to material and relevant matters, but the determination as to the relevancy rests with the court. The right of this form of examination should be exercised immediately after the principal examination, but in some cases it is allowed later. (See Evidence; Due Process of Law). Consult Wellman, ‹Art of Cross-Examination› (New York 1904).

CROSS-FERTILIZATION is a term used mainly by botanists and horticulturists and, in a strict sense, applies to the fertilization of the ovules of one seedling plant by pollen from another seedling plant. In a rather loose way, it is sometimes used to refer to the cross-pollination of a flower with pollen from a different flower on the same plant, but its use in this sense is erroneous, as the act of cross-pollination in this case does not give cross-fertilization, or cross-fecundation. «Cross-fertilization» as used by Darwin in his classical work on this subject, to quote his words, «always means a cross between distinct plants which were raised from seed and not from cuttings or bulbs.» Plants raised from cuttings or bulbs may possibly have been derived from the same seedling, and flowers fecundated with pollen from different plants thus derived would not be cross-fertilized.

In animals and man cross-fertilization means the crossing of different races or miscegenation in opposition to inbreeding. Here close or self-fertilization, such as occurs commonly in plants, is impossible in most higher animals, as in general only the lower animals are hermaphrodite, having both male and female organs, while this phenomenon is common in plants. In animals and man, therefore, cross-fertilization has a somewhat different meaning than when used in reference to plants. In plants, however, as in animals, if individuals of different races or species are bred together, they are said to be cross-fertilized, in contradistinction to self-fertilized.

CROSS-FERTILIZATION IN PLANTS.

Methods by Which Cross-Fertilization is Accomplished.—While a knowledge of the sex distinction of animals dates from the dawn of human history, the sexuality of plants remained unknown until about two centuries ago. Experimental proof of the sexuality of plants was published for the first time by Camerarius in 1691, and only after this discovery was the function of pollen known and its necessity in seed formation recognized. The first recorded hybrid was made by Thomas Fairchild about 1711, and very careful studies of plant hybrids were published by Koelreuter in 1760. With all this accumulating knowledge of the sexuality and crossing of plants, it is surprising that the true meaning and significance of the flower and its various adaptations to secure cross-fertilization was not perceived until Christian Conrad Sprengel completed his researches and in 1793 published his now classical work entitled, ‹The Secret of Nature Discovered in the Form and Fertilization of Flowers.› Sprengel discovered the principal facts connected with the cross-pollination of flowers by insects. He recognizes the true significance of honey and of bright-colored flowers, that they were but means to attract insects to the flowers and that the insects carried pollen from one plant to another and aided in securing cross-fertilization. He, however, failed to recognize that the plant derived any benefit from the cross-fertilization. It was left for Charles Darwin, the great English naturalist, to point out that certain species of flowers are entirely dependent for fertilization on the transfer of the pollen from one plant to another and that self-fertilization is in the majority of cases actually injurious, resulting in loss of vigor in the progeny. The transfer of pollen in cross-fertilized plants is generally accomplished through the agency of the wind, water, insects or birds, and the various devices that have been adopted by the plant to secure crossing form an interesting and inexhaustible field for study and observation.

Wind-fertilized or anemophilous, flowers are those so modified as to depend upon the wind to secure cross-fertilization by carrying the pollen of one plant to the stigmas of another. Anemophilous plants are characterized by having dry and powdery pollen, which is very abundant and light and easily carried by the wind. In most cases also the pistils are large and feathery, with large, sticky stigmas, presenting an abundant surface to catch the pollen floating in the air. In wind-fertilized plants there is a great opportunity for loss of pollen and it thus becomes necessary that an abundant supply should be formed. The various pine-trees, of which there are large forests in some parts of America, are wind-fertilized and form enormous masses of pollen. In this case, the pollen grains are provided with two lateral wing-like extensions which are supposed to be of service in making the pollen lighter and easier to blow about. Several instances are recorded where the decks of vessels at sea have been covered by a rain of pollen which, in some cases, must have been carried a distance of some 400 miles. Corn, or maize, forms a familiar example of a wind-fertilized plant. The pollen is produced in great abundance in the stamens of the tassel, which forms the upper part of the stalk. When the pollen is mature the stamens protrude from the flower and the slightest jarring of the plant by the wind causes the pollen to fall in a cloud, and as the plants are grown near together, some grains are almost certain to lodge on the pistils, or silks, of the ear of another plant. The silks are long and are covered with numerous stigmatic hairs so that the opportunity for plants to catch floating pollen and be cross-fertilized, in an ordinary field where numerous plants are grown, is very great. Experiments prove that cross-pollination is so universal that it is very difficult to keep varieties of corn pure. If different varieties are grown near each other cross-fertilization is certain to occur and impure seed results. Vilmorin found by careful experiments that plants of different varieties have to be separated by at least 1,000 feet to prevent cross-fertilization, and this distance is by no means sufficient if strong winds blow over one field of corn in such a direction as to carry the pollen from it toward another field of corn. Nevertheless it is well known that a number of plants must be planted near together to ensure thorough pollination. Plants standing alone at a distance from other corn plants seldom produce well-filled ears. The flowers of wind-fertilized plants are usually green, or greenish, inconspicuous, and have no odor or nectar. The flowers are ordinarily regular in form and they frequently appear before the leaves, though this is by no means universal.

Water-fertilized, or hydrophilous, plants, are those in which the pollen is transferred through the agency of water, and are not very common. Following Delphino, they may be divided into two types: the first type includes *Zostera, Posidonia*, etc., and the *Florideæ,* where the pollen is of the same specific gravity as water, and is carried here and there by water currents; the second type includes such plants as *Ruppia* and *Vallisneria*, in which the pollen is lighter than water, or is borne on a floating raft formed by the loosened flower. The peduncles of the female flowers elongate and bring them to the surface of the water where their position allows the stigma to be pollinated by the floating pollen.

By far the greatest number of plants that require cross-fertilization depend upon insects as pollen carriers, and these plants have been termed entomophilous. Such plants are characterized by the large size, showy colors and markings of their flowers and their odor, which serve to advertise the nectar and nourishing pollen that the flower contains and thus attract insects to the flower. The insects in passing from flower to flower in search of nectar and pollen become useful to the plant by incidentally transferring pollen from one flower to the stigmas of other flowers, thus causing cross-fertilization. Flowers have in many cases become adapted to certain insects and have stamens and pistils developed in the position best suited to ensure pollination when these insects visit the flowers for nectar or pollen. Many insects depend wholly, or in large part, on the nectar and pollen of flowers as food, and such insects usually visit only one kind of flower during the day and therefore carry but one kind of pollen. They work systematically, passing from one flower to another, and clearly do an enormous amount of crossing and waste less pollen than the wind or water. Some insects, like certain beetles, have smooth bodies and carry but little pollen, but many beetles, and all bees, moths, butterflies, etc., have their bodies, wings and limbs roughened with hairs and scales, and these collect and retain a large quantity of pollen ready to be left on the sticky stigmatic surface of the pistil of the flower when the insect rubs against it. The nectar glands of the flower are usually located in such a position that the insect in getting to them to suck the nectar must enter the flower in the best way to ensure cross-pollination. Insects are greatly attracted by odors, and the flowers of many plants have a strong scent which serves to make them more attractive. The evening primrose (*Œnothera*), which opens early in the evening and is fertilized by night-flying moths, has a very strong odor, and the same is true of many night-fertilized flowers, such as the honeysuckle (*Lonicera caprifolium*), night-blooming Cereus, etc. Night-blooming flowers which are fertilized by insects are usually white and generally more sweet-scented than day-blooming flowers. Some flowers, such as the Stapelias, are purplish or brownish, resemble decayed flesh in appearance and are carrion-scented to attract carrion flies. Certain insects are attracted by certain colors more than others. The favorite color of the honey-bee, for instance, is said to be deep bluish-violet, while pure blue and violet are pleasing. Yellow is less sought, but is not avoided, while red is disliked and shunned. Kerner states that in the Vienna Botanical Gardens the honey-bees in great numbers visit the bluish-violet flowers of *Monarda fistulosa,* and the blue flowers of the hyssop (*Hysopus officinalis*), but avoid the scarlet flowers of the *Monarda didyma.* Experiments, however, tend to show that color does not necessarily attract insects; flowers rich in nectar are the most attractive. In some plants the involucre is highly colored and takes the place of the colored parts of the flower. Such is the case in some *Euphorbias* such as snow-on-the-mountain, which is nearly white, and the poinsetta (*E. pulcherrima*), in which the involucre is red. In a large number of cases the petals of large flowered species show spots or lines on the main part of the flower of different color from the main ground color of the petals. These are usually known as nectar guides and are believed to be of service in aiding insects to find the nectar.

One of the most interesting and instructive modifications to secure cross-fertilization is the formation on different plants of flowers with different lengths of stamens and styles. Sprengel noted that some plants in *Hottonia* bear only flowers whose anthers are included in the tube, but whose style is exserted; while other plants bear only flowers having short styles and long stamens, longer than the flowing tube. He was, however, unable to suggest any reason for such variations. Some plants, such as *Lythrum*, regularly show these different lengths of stamen and style. Darwin subjected the peculiar sexual relations of these plants which he called dimorphic and trimorphic, to most careful and extensive research, crossing the different forms back and forth in various ways. The results of these researches are summarized below.

In dimorphic plants, such as *Primula* and *Linum*, two forms exist in about equal number and usually growing together. In one form the plants have flowers with a long style extending considerably beyond the short stamens, while in the other form, the position is reversed, the style being short and the stamens long. In the long-styled form the stigma is rough and furnished with long papillæ, and the pollen grains are small, while in the short-styled form the papillæ of the stigma are short and the pollen grains are larger (Fig. 3). In the trimorphic heterostyled plants of *Lythrum salicaria* three lengths of styles are formed, long-styled, mid-styled and short-styled (Fig. 1). In each form the stamens exist in groups of two lengths corresponding to the two other lengths in which the styles occur in other plants. The longest stamens produce the largest pollen grains, the shortest stamens produce the smallest grains. When insects visit the dimorphic and trimorphic flowers, their organs become dusted with the pollen at certain heights. When they later visit other plants with other lengths of styles, this pollen will be at the exact position and height to best cause cross-fertilization. In such crossing a pistil always receives pollen from stamens of corresponding heights and the size of the pollen grain is thus proportional to the length of the style which its tube must traverse. Such crossing Darwin called legitimate. When a pistil of a dimorphic or trimorphic flower is crossed with pollen from stamens of different heights he termed it illegitimate fertilization. By very careful experiments Darwin found that only seeds produced as a result of legitimate crossing give completely normal and fertile plants. Illegitimate crossing leads to the production of progeny with all degrees of diminished sterility or even complete barrenness and give offspring which have all the characters of hybrids produced by the union of different species.

Aside from the classes above mentioned a few plants are specially adapted to cross-fertilization by small birds and snails, but such plants are few in number and their modifications are similar to those adopted by plants which are fertilized by insects.

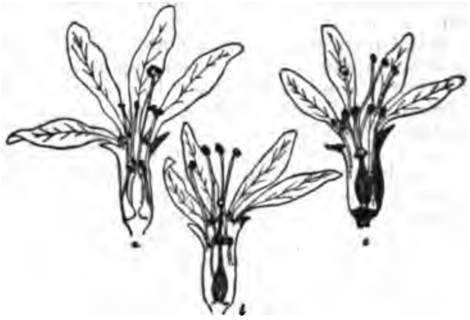

FIG. 1.— Trimorphic flower of *Lythrum salicaria* L; *a*, long-styled flower; *b*, mid-styled flower; *c*, short-styled flower; with one-third of calyx, corolla, and stamens removed in each case. (After Muller.)

Prepotent Pollen.— The great majority of plants that have devices to secure cross-pollination also have some modification that ensures self-fertilization. This in a way would seem to have been developed as a safeguard to ensure seed development should cross-pollination fail to take place. In most cases the self-pollination takes place before or about the same time as the cross-pollination, and it would seem that in such cases where the plants are not self-sterile that a large majority of self-sterilized seeds would be formed. However, it has been found in many cases that the pollen of a different plant of the same race or species or in some cases of a different race will be prepotent over the plant's own pollen. In one instance, Darwin selected two flowers which had only recently opened on a plant of a variety of cabbage known as "Ragged Jack," and abundantly pollinated them with pollen from the same plant. After an interval of two or three hours pollen of a different variety, known as "Early Barnes," was dusted on the stigmas of the same flowers. Under the circumstances it would seem that little effect could be expected from the pollen of the Barnes cabbage, yet three out of the 15 plants raised from the seed formed by the above two flowers showed plainly that they were hybrids.

A similar experiment was carried out by the writer with cotton. A bud of Sea-Island cotton (*Gossypium barbadense*) was covered with a manila paper bag before it had opened. Early in the morning, when the flowers of cotton normally open and are pollinated, the bag was removed and the stigma abundantly dusted with pollen from the same flower, after which the bag was replaced. Cotton is abundantly self-fertilized, about 5 to 15 per cent of the flowers being normally cross-fertilized under the most favorable circumstances, so that this capsule should have set the normal number of seeds without further pollination. After four hours the bag was removed and the same stigma dusted with pollen of upland cotton (*G. herbaceum*), which belongs to a different but nearly related species. The seed of this Sea-Island capsule gave five plants, of which three were clearly hybrids.

The prepotency of pollen can be easily observed where different races or varieties are concerned, but in cases where the pollen of a different plant of the same race or species is prepotent over the plant's own pollen, as is not infrequently the case, the fact is not so easy to prove. Darwin demonstrated prepotency in a number of cases of this kind, using as his guide the superiority of seedlings raised from cross-fertilized seed to those resulting from self-fertilization, which after a few experiments can be used as a fairly safe index.

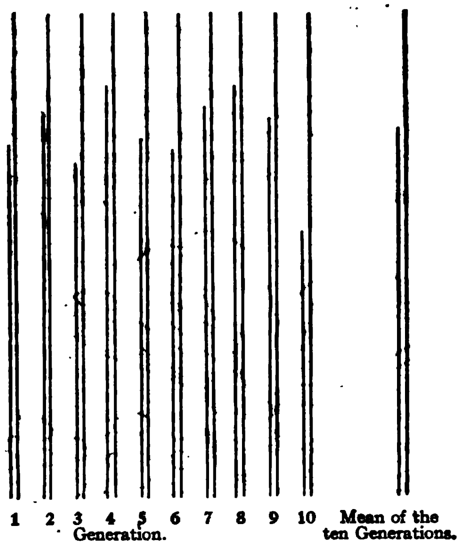

Fig. 2.— Diagram showing the mean heights of cross- and self-fertilized plants of *Ipomœa purpurea* in ten generations, the mean height of the crossed plants being taken as 100; on the right hand are shown the mean heights of the cross- and self-fertilized plants of the ten generations taken together. (After Darwin.)

Benefits of Cross-fertilization.— The benefit derived from cross-fertilization in the case of plants was first clearly brought forward through the classical treatise of Charles Darwin on «the Effects of Cross- and Self-fertilization in the Vegetable Kingdom.» Sprengel at times apparently foresaw this law, but he seems never to have grasped its full signifcance. In one place he states «it appears that nature has not willed that one flower should be fertilized by its own pollen,» yet he failed to realize that this carrying of pollen from one flower to another was of any service to the plants themselves. Knight, Koelreuter and Herbert plainly had the main features of this law in mind, but did not recognize it as of sufficient importance to give it special attention. Darwin carried on extensive experiments to demonstrate the effect of cross- and self-fertilization in various plants and his conclusions are generally accepted to-day. His general plan of experimenting was to grow cross- and self-fertilized seed of the same plant in the same pot on opposite sides, with a partition between them. They were carefully watched and as often as one on each side germinated at the same time they were transplanted to another pot and again placed on opposite sides of a superficial partition.

The increased vigor and productiveness due to cross-fertilization may be illustrated by Darwin's experiments with morning-glory (*Ipomœa purpurea.* The experiments were carried to the tenth generation and in each generation the height of the cross-fertilized plants greatly exceeded that of the self-fertilized plants (Fig. 2). The ratios between the average heights of cross- and self-fertilized plants in the different generations were as follows:

1st generation, as 100 to 76.
2nd generation, as 100 to 79.
3rd generation, as 100 to 68.
4th generation, as 100 to 86.
5th generation, as 100 to 75.
6th generation, as 100 to 72.
7th generation, as 100 to 81.
8th generation, as 100 to 85.
9th generation, as 100 to 79.
10th generation, as 100 to 54.

The average ratio of height during the 10 generations was 100 to 77. The same vigor and superiority of the cross-fertilized plants was also shown in all other features, such as the number of capsules and seed, constitutional vigor, etc., in fully as marked a proportion as was shown in increased height. Similar superiority of cross-fertilized over self-fertilized plants has been demonstrated to occur in *Mimulus, Digitalis, Verbascum, Papaver,* and many other plants, and the rule may be considered a fairly general one. However, the evidence available at present does not tell nearly so much in favor of the advantages of cross-fertilization as did that of Darwin's time.

Darwin's experiment with the common garden pea, however, form an exception of some interest. Here the average height of the cross-fertilized plants was 34.62 inches and that of the self-fertilized plants 39.68 inches, or in the proportion of 100 to 115. The pea, however, is a plant that is normally self-fertilized, crossing rarely occurring. The plant has therefore become adapted to self-fertilization, and does not lose vigor as a result. The lack of vigor shown by the cross-fertilized progeny would indicate that such plants which are normally self-fertilized may have assumed this habit through some benefit derived from the self-fertilization and would thus be injured as a result of crossing. Wheat, barley and oats, among the cereals, are almost wholly self-fertilized, crossing very seldom occurring. As a result of experiments conducted by Professor Hays, of the Minnesota Agricultural Experiment Station, it has been shown that the artificial crossing in wheat of individuals of the same race, or of different races, almost invariably results in decreased fertility as a whole, although as a result of crossing distinct races, certain individuals with increased fertility can be selected.

It has been said by Nægeli that «the consequences of fertilization reach their optimum when a certain mean difference in the origin of the sexual cells is attained»; and by Fritz Müller, that «every plant requires, for the production of the strongest possible and most prolific progeny, a certain amount of difference between the male and female elements which unite. Fertility is diminished as well when this degree is too low (in relatives too closely related) as when it is too high (in those too little related).» Darwin says: «The offspring from the union of distinct individuals, especially if their progenitors have been subjected to very different conditions, have an immense advantage in height, weight, constitutional vigor, and fertility over the self-fertilized offspring from one of the same parents."

Attention has been called by Willis to three factors in the gain resulting from cross-fertilization, namely, *a*, fertility of mother plant; *b*, vigor of offspring; and *c*, fertility of offspring. The relative value of these factors varies with different plants. In the carnation, for instance, factor *a* of cross-fertilized plants was 9 per cent greater than in self-fertilized plants, *b* was 16 per cent greater, and *c* was 54 per cent greater; in tobacco, factor *a* was 33 per cent less than in self-fertilized plants, but factor *b* was 28 per cent greater, and factor *c* 3 per cent greater. Even when the fertility of the mother-plant is greatly reduced by hybridizing with a distinct species and the hybrids themselves are sterile or very unfertile they nevertheless often show extraordinary vigor, that is, *b* is often greater in hybrids than in pure-bred plants, but factors *a* and *c* show usually less.

In plant breeding the importance of the increased vigor resulting from cross-fertilization is very great. In cases where there is no particular object in keeping the varieties pure, a marked increase in yield may be obtained by using crossed seed. The practical value of this fact is indicated by results obtained at the Illinois Experiment Station by Morrow and Gardner in crossing various races of corn. Of 15 cross-bred corns tested, 12 gave a decided increase in yield over that of the parent sorts, ranging from 2 to 86 per cent in individual cases. In three cases a decrease in yield of from 8 to 20 per cent resulted. In the 15 cases taken together an average increase in yield of about 16 per cent was secured. In some cases the cross-bred corns were grown to the second generation without crossing and showed a decidedly larger yield than the parent varieties. A number of crossing experiments of a similar nature had previously been made by McCluer with corn and practically the same results obtained. McCluer states that: "The corn grown from the crossed seed was in nearly all cases clearly increased in size as a result of crossing," and that "nearly all the corn grown a second year from the crosses is smaller than that grown the first year, though most of it is yet larger than the average size of the parent varieties."

In maize, the loss of vigor caused by close inbreeding was found in experiments conducted by the writer, in conjunction with Mr. C. P. Hartley, to be very marked. Seeds of Hickory King, a race grown commonly in the Eastern States, produced by inbreeding with pollen of the same stalk, yielded the next year at the rate per 100 stalks of 46 ears, weighing 9⅓ pounds. Seeds of the same race, in every way comparable, but produced by crossing different seedlings, yielded under the same conditions at the rate per 100 stalks of 82 ears, weighing 27½ pounds. In attempting to fix hybrids of Hickory King crossed with Cuzco or Peruvian corn, some ears were inbred with pollen from the stalks bearing them, while others were pollinated from other hybrid seedlings of the same parentage. The hybrids of the second generation, where the seed was inbred with pollen from the same stalk, showed great loss of vigor, being small in stature and almost totally sterile; while those produced from seed which was inbred with pollen from a different seedling were much more vigorous and productive, seeming to have lost but little by this process of inbreeding. In the majority of cases crossing distinct sorts improves the vigor and results in greatly increased yield. By selecting varieties which have increased yields uniformly when crossed and crossing these for seed corn, it seems certain that the average yield can be greatly increased. Securing seed corn from a cross of any two races desired is not a difficult or expensive process, being easily accomplished by planting the two desired sorts in alternate rows and removing the tassels, as soon as they ap-

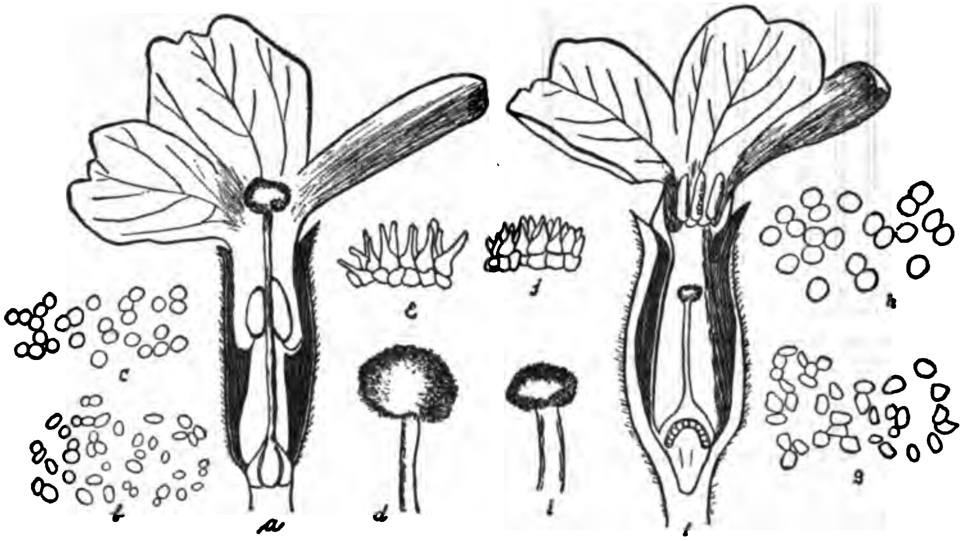

FIG. 3.— *Primula elation; a–e,* long-styled flower; *f–j,* short-styled flower; *b* and *g*, pollen grains dry; *c* and *h*, pollen grains moist; *d* and *i*, stigmas; *e* and *j*, stigmatic papillæ. (After Muller).

pear, from the one to be used as the female parent. The ears that form on the rows from which the tassels have been removed will have been crossed with pollen from the variety from which the tassels have not been removed. The seed corn should therefore be selected from the ears produced on the detasseled rows. The field planted to the two varieties, as above described, to secure crossed seed should be somewhat isolated from other cornfields, and should be of sufficient size to produce the necessary quantity of seed. The only extra expense incurred in producing seed corn in this way is the cost of de-tasseling the alternate rows, as ears will form on both as usual.

Shull, East, Emerson and others have more recently demonstrated this same principle and the effect produced in crossing diverse types has been related to the fact that the crosses possess a larger number of favorable growth factors.

The increased vigor and fruitfulness which almost invariably result from crossing closely related sorts of varieties is a principle of the utmost importance in our common agricultural practices, for there is a great need for more vigorous forage plants, timber and shade trees, vegetables, etc., and more prolific grains and fruits.

Self-sterile Plants.— Some plants have become so completely modified for cross-fertilization that they are sterile to their own pollen and will not set seed unless cross-fertilized. Of our wild plants this has been found to be the case in a number of instances. Koelreuter and Gärtner long ago found that some plants, namely, *Verbascum phœniceum, V. nigrum* and *Lobelia fulgens,* under certain conditions were sterile to their own pollen, but would set seed abundantly when crossed with pollen of other species. Fritz Müller proved by careful-experiment that *Eschscholtsia californica, Abutilon Darwinii* and a species of begonia were sterile to their own pollen, whether fertilized with pollen from the same flower or from different flowers on the same plant, but were perfectly fertile when cross-pollinated with pollen from other plants. Darwin found that these plants in England were also largely self-sterile, but that under certain conditions the degree of fertility with their own pollen could be greatly increased. The same phenomenon of self-sterility and necessity for cross-pollination is shown by some of our important cultivated plants. Mr. M. B. Waite has demonstrated that many of the varieties of pears, such as Bartlett, Anjou, etc., are largely self-sterile, producing few or no fruits when pollinated only with pollen of the same variety. In the case of varieties of pears and fruits of this kind that are propagated altogether by budding, as is well known, all of the various trees of the variety that exist are simply parts of the same individual, so that pollinating flowers on one Bartlett pear-tree with pollen from another Bartlett pear-tree is in effect the same as pollinating one flower on a plant with pollen from a different flower on the same plant and is what we recognize as self-fertilization. Mr. Waite and others have shown that when such sterile varieties are pollinated from a different horticultural variety, which in reality is simply a different individual of the same species, they are rendered perfectly fertile. This discovery has proved of great practical value, as many pear orchards were planted with trees of a single variety like the Bartlett and were found for some unknown cause to be very unfruitful. Waite's discovery showed the true cause of this lack of fruitfulness and at the same time pointed out the natural and simple remedy of cross-fertilization. All that remained to be done in such barren orchards was to bud some of the trees over with buds of varieties which had by experiment been found to produce a good percentage of fertility in crossing on the variety concerned. Since Waite's discovery of the reason for the barrenness of certain varieties of pears many experiments have been conducted by different investigators. It is now known as a result of experiments by Waite, Waugh, Beach and others that many varieties of plum and apple are largely sterile and require cross-pollination for complete fruitfulness.

The pineapple, also, as shown by the writer's studies is an interesting example of a self-sterile plant. Ordinarily the pineapple is wholly seedless, yet the flowers are so arranged that they are abundantly fertilized with their own pollen. The self-sterility is so perfect that even under these circumstances seeds set so rarely that few growers and consumers have ever seen seeds. In experiments in crossing various varieties it was found that when certain varieties were crossed seeds were formed in abundance, showing that cross-fertilization is necessary to ensure the development of perfect seeds. The explanation for the setting of such few seeds in cultivation normally is probably to be found in the fact that the proper insect pollinators are not present, and the flowers are therefore not cross-fertilized. See FERTILIZATION IN PLANTS; FERTILIZATION IN FLOWERS.

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CROSS-FERTILIZATION IN ANIMALS AND IN MAN. In animals and man, cross-fertilization means the crossing of individuals of different races or breeds in contradistinction to in-and-inbreeding which is generally regarded as leading to evil results. Inbreeding, interbreeding or close breeding, which means the breeding together of closely related animals at rather distant or long intervals, seldom or never results in evil effect. It is the continuous in-and-inbreeding of closely related individuals, generation after generation, without intermission, that is believed by some to result in delicacy of constitution, predisposition to disease, lack of fecundity, etc. It must be admitted that breeders who have used in-and-inbreeding the most have done so as a means to an end, and not because they believe primarily in any beneficial result of in-and-inbreeding in itself. This is the surest and best way to render a character prepotent — i.e., to isolate pure Mendelian characteristics. (See HEREDITY). It is used, therefore, as a means of strengthening the transmitting power or prepotency of a character, which otherwise in most instances would be lost. Miles states that «From a careful examination of the pedigrees . . . that may be found in the herd-books and breeding-registers, representing the practice of breeders of acknowledged reputation, it will be found that in-and-inbreeding has only been resorted to in the case of some favorite animal or animals that were superior in certain respects to the average members of the herd or family which they represent, and the object has evidently been to secure in the offspring a predominance of their most highly valued characters.» In most instances the older original character is more strongly hereditary, and it is only by in-and-inbreeding that a new character can be rendered stable and prepotent and prevented from being swamped and lost. In regard to the belief that in-and-inbreeding leads to sterility and predisposition to disease, a careful consideration of the evidence at command leaves the student in doubt as to the conclusion to be drawn. The facts seem to indicate that close breeding or in-and-inbreeding may be very detrimental in some cases, as it tends to perpetuate any constitutional defects that may have been produced by other agencies; therefore the best animals, free from constitutional weakness or disease should be selected as mates. When used judiciously, in-and-inbreeding forms an important means of securing improvements and is the only known means of fixing and rendering slight variations hereditary.

The majority of our various breeds of cattle have been brought up and improved as a result of very close inbreeding. As an illustration, the famous shorthorn bull, Favorite, was bred to his daughter, granddaughter and great-granddaughter, and the product of the last union was matched with the bull Wellington, having 62.5 per cent of the blood of Favorite. Clarissa, the offspring of the last union, was bred with the bull Lancaster, having 68.75 per cent of the blood of Favorite and gave very valuable offspring. The majority of our best breeds of animals have been very closely in-and-inbred without noticeable deterioration in any direction except possibly in fecundity. Darwin says that «Although by careful selection of the best animals, close inter-breeding may be long carried on with cattle, yet the good effects of a cross between almost any two breeds is at once shown by the greater size and vigor of the offspring; and authorities agree that ‹crossing distinct breeds certainly improves cattle for the butcher.›»

In the case of man, where families have interbred very closely, as has sometimes occurred, there is said to be a great gain in vigor as a result of intermarriage with a distinctly different family, a fact long recognized and acted upon in the seeking of American heiresses in marriage by scions of ancient European families of distinction. The hardihood and general vigor of the Americans as a nation is commonly attributed to the great intermixture of peoples of many different nationalities; and the whole human race, apparently from the beginning has acted on this principle by the almost universal practice of exogamy. This is the rule, held all but sacred among savages everywhere, that a man or woman must not marry one of his or her own group (clan, gens or phratry) but must intermarry with an individual of some other of the minor divisions of the tribe. The theory is that all members of each such minor divisions are children of the same (ancestral) mother. The world-wide prohibition of, and repulsion against, marriage within certain degrees of consanguinity, minister to the same end. Inter-racial marriage, or miscegenation, the marriage of individuals of distinct races, as a whole, results very disastrously both as to physical and mental characteristics. The result of such a union is a hybrid, frequently sterile, mainly intermediate in characters between the two races, and usually in large measure a social outcast. Such half-breeds or hybrids are in general inferior to the pure parental races, particularly in physical vigor, though mentally they may be equal or possibly superior. In crosses, for instance, of the negro and white races, the offspring commonly show a tendency toward sterility and are in general weak in constitution.

In conclusion it may be stated that injury results on the one hand from too close inbreeding and on the other hand from crossing races too distinct; but that the crossing of slightly distinct strains, and of individuals reared under different conditions, is beneficial. See BREEDING; EXOGAMY; HEREDITY; MENDEL'S LAW, and consult bibliographies under these articles.

ERNEST INGERSOLL.

CROSS-EXAMINATION. The examination of a witness, called by the party against whom he has testified. The purpose is generally to test the character of the witness and the truthfulness of his statement, the sources of his information, etc. Leading questions are permitted on the cross-examination, although the counsel must confine his interrogations to relevant matter. The relevancy of the matter is determined by the court. Generally, a cross-examination takes place directly after the chief examination; but if the court permits, it may, on the presentation of valid reasons for delay, be held later. Consult Wellman ‹Art of Cross-Examination› (New York 1910).

CROSS-FOX, a peculiarly marked northern variety of the American red fox. It has a dark line along the back, and crossing this a stripe on the withers. This gives its name. Its rarity and beauty make its skin more valuable than is the pelt of the ordinary fox.

CROSS KEYS, Va., post village in Rockingham County, 20 miles northeast of Staunton, where a battle took place 8 June 1862, between the Union and Confederate forces. The engagement was a strategic success for the Confederates, in that it checked the pursuit by Frémont and prevented his joining with General Shields for a combined attack.

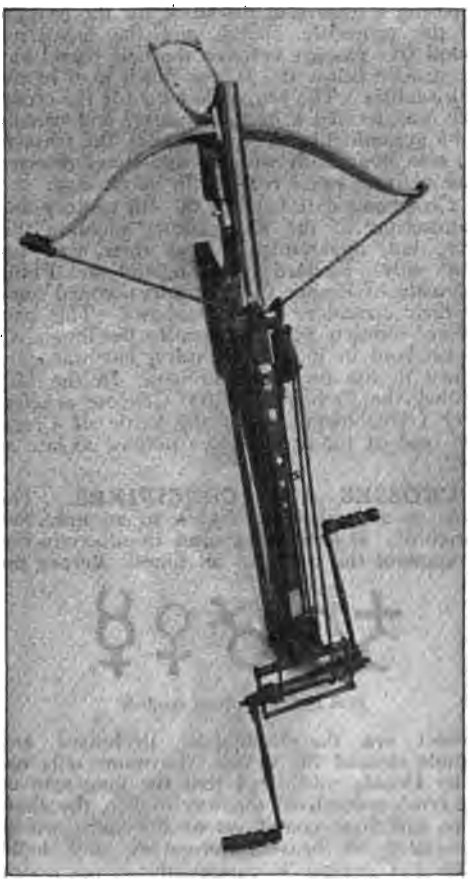
CROSS KEYS, Battle of. On the morning of 8 June 1862 General Frémont, with 10,500 men and 44 guns marched from Harrisonburg, Va., following Gen. «Stonewall» Jackson, who had been pursued up the Shenandoah Valley, and who had now fallen back in the direction of Port Republic. Frémont's cavalry drove in Jackson's, and when eight miles beyond Harrisonburg Cluseret's brigade, in advance, came upon General Ewell's division of about 5,000 men and 16 guns, at Cross Keys, and Frémont formed for attack. Cluseret's brigade, with artillery, was on and near the road; Stahel's and Bohlen's were sent on the left; Milroy's and Schenck's on the right. Eight batteries were put on the line and opened a spirited fire. Stahel was now ordered to attack Ewell's right and, going forward, met with some success, but when his two left regiments were ascending a gentle slope and had approached within a few feet of its summit, Ewell's men opened with an unexpected and severe fire, and the regiments were repulsed with great loss. Part of Ewell's line pursued, but was checked and driven back by Stahel's right regiment, which was concealed in the woods. Bohlen's brigade was now ordered forward, but under conflicting orders it was misdirected, and for the most part remained as support to the batteries. Re-enforcing his own right, Ewell advanced beyond Frémont's left, got an enfilading fire on his batteries, which, not properly supported, were withdrawn, the infantry following a full mile. Meanwhile on the right Milroy and Schenck had made some progress, and were preparing to make a determined attack on Ewell's left, when Frémont ordered them to fall back and re-enforce his left, but by this time his left had been forced back, and the entire line fell back at 6 P.M. to organize for a renewal of the battle in the morning. During the night and early in the morning Ewell withdrew, under Jackson's order, to join in an attack on General Shields, who was nearing Port Republic by way of Luray Valley. Frémont followed Ewell to the south fork of the Shenandoah, to find that he had burned the bridge behind him and joined Jackson. He was an idle spectator of the battle of Port Republic, 9 June, in which his comrades were defeated, and the day following he returned to Harrisonburg. The Union loss at Cross Keys was 558 killed and wounded and 127 missing. The Confederate loss was 273 killed and wounded and 15 missing. Consult 'Official Record' (Vol. XII).

CROSS IN MYTHOLOGY. See NATURE WORSHIP; MEXICAN MYTHOLOGY; SWASTIKA.

CROSS VINE. See BIGNONIA.

CROSSBILL, a bird of the genus *Loxia* belonging to the finch family (*Fringillidæ*) and unique from the character of the bill the two mandibles of which are twisted awry so that they cross. This peculiarity has given rise to a well-known and pretty legend to the effect that the crossed beaks is a mark of the bird's pity in having attempted to draw the nails which held Jesus' hands and feet to the cross, and that the red plumage of some species is the dye of his blood. This singular structure, having the appearance of a deformity, is in reality a wonderfully efficient mechanism for tearing asunder and extracting the seeds of pine cones on which these birds largely feed. Two species belong to the North American fauna, the red crossbill (*L. curvirostra*) and the white-winged crossbill (*L. leucoptera*). Both are birds of the northern pine and spruce forests, breeding within the United States, which they do in the very early spring, and only in the extreme northern States and the higher mountains. They are better known as irregular winter wanderers, which appear in flocks usually containing both species, remain in a neighborhood until they have devoured all of the seeds of conifers which are to be found, and then leave. Closely related species are found in Europe and Asia.

CROSSBOWS. Called also *arbalests*. The main elements that compose the crossbow are the *arbrier* or stock and the short, powerful bow mounted on the stock at right angles. At the bow end is a «stirrup» or loop of iron. The bowstring, when at tension, is released by a trigger. For its discharge the weapon is held

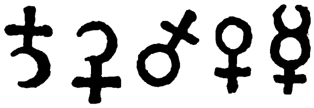


German seventeenth century crossbow.

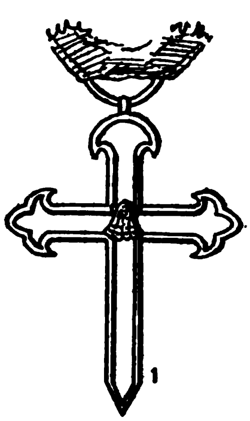
up to the shoulder as with the modern gun. The bow, in its early stages, when drawn by hand, was built up of a number of layers of whalebone, usually. To bend the bow the stirrup end was placed on the ground and, to hold the weapon firm, one foot was placed in it thus releasing the hands to pull the bowstring (made of sinew) back to a notch in the stock. For firing, the butt end was held up to the shoulder as with our modern guns. When, later, the more powerful bow of steel was used, the necessity for a mechanical power arose and the *pied de biche* (hind's foot) or "goat's foot," with its double lever purchase was used. Still further fortifying the bow brought forth the detachable "wheel and rachet" (*cric*) or "winder," in which a cogwheel, turned by a handcrank, acted on a movable rachet which engaged the bowstring. Another device was the detachable roller-purchase (*à tour*), in which a drum turned by a crank (*moulinet*) wound a long cord working on a system of fixed and free pulleys to draw up the bowstring. The crossbow *à jalet* or "prodd" had the bow bent by a lever fixed to the stock. It was used, in the 16th century, for discharging stones, lead bullets, etc., for birdshooting (fowling). A "barrelled" crossbow (set by hand) had a half tube superimposing a groove in the stock for the passage of the projectile (bolt), and the bowstring found free passage between the half barrel and the groove below it. It was much used in the 17th century. The projectile used for the crossbow was termed a *bolt* or *quarrel* and usually had a pyramidal head (termed *pile*), the *feathering* was done with wood — sometimes inserted diagonally to cause rotating in its passage.

Crossbows date back to the 4th century and manuscripts of the 10th century mention this arm; but, apparently, it was then used for sport only. Richard I of England and Philip Augustus of France (12th century) armed some of their crusaders with crossbows. This arm became obsolete (giving place to the longbow) in England in the 13th century, but was continued in use on the Continent. In the 14th century the French had 6,000 Genoese *arbalestiers* (crossbow men) at the battle of Creçy. We read of the use of the crossbow as late as 1572.

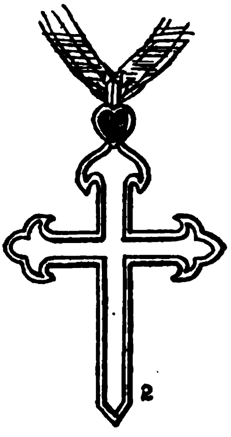
CROSSES AND CRUCIFIXES. The cross as a symbol dates back to an unknown antiquity. It was recognized in all countries throughout the world at all times. Before the present era the Buddhists, Brahmans and Druids utilized the device. Seymour tells us: "The Druids considered that the long arm of the cross symbolized the way of life, the short arms the three conditions of the spirit world, equivalent to heaven, purgatory and hell." With the ancient Egyptians the cross was a reverenced symbol. Their *ankh* (*crux ansata* or handled cross) represented life, and a perpendicular shaft with several arms at right angles (Nile cross) appears to have had some reference to fertility or crops. Five of their planet symbols (see illustration) were represented by a cross attached to a circle or part of a circle. Prescott says that when the first Europeans arrived in Mexico, to their surprise, they found "the cross, the sacred emblem of their own faith, raised as an object of worship in the temples of Anahuac." To the Christian the cross and the crucifix represent the Savior, also his Faith, and the Church. Crosses, according to their utilization, may be classified as: Ecclesiastical, heraldic and architectural.



Five Egyptian planet symbols.

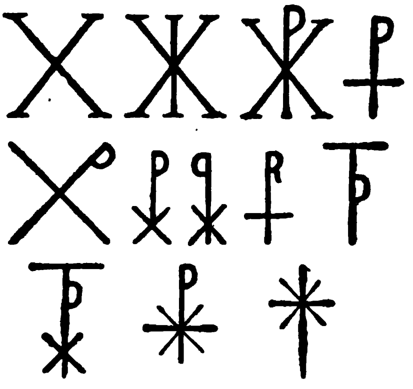


1. Cross of the order of St. James, Spain.



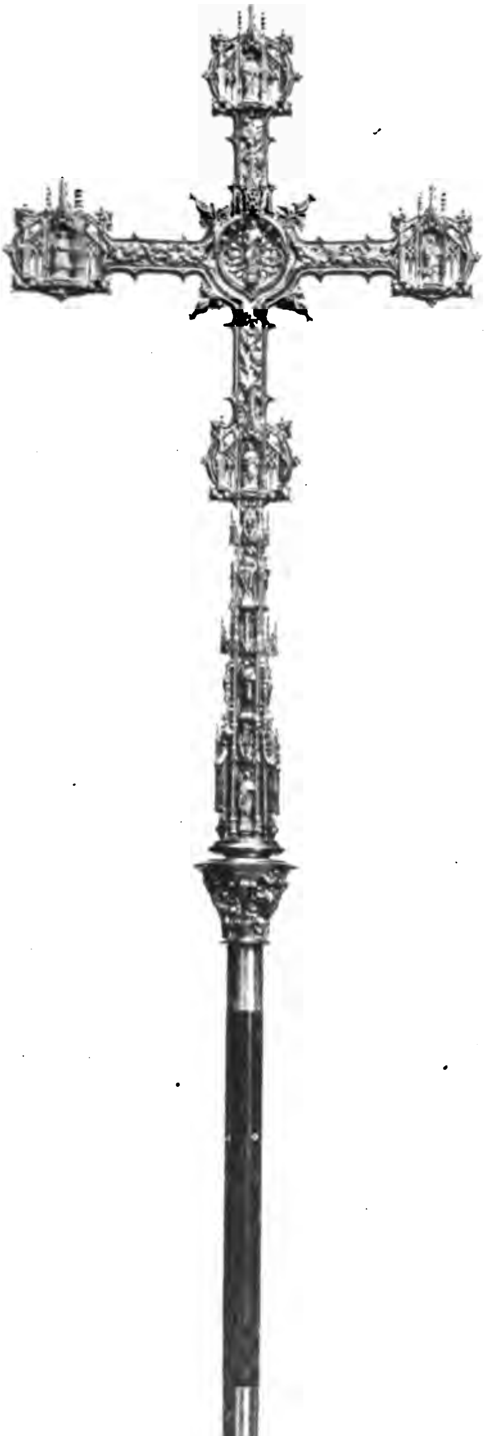
2. Cross of the order of St. James, Portugal.

In Ireland great monoliths beautifully carved into elaborate crosses are found. They date from the early Celtic Christian period and they are freely inscribed with Runic inscriptions — hence these crosses are vulgarly termed "Runic" crosses. A beautiful specimen of these monuments is in the Metropolitan Museum of Art, New York city. In some of the religious orders, the official insignia consist of a cross; also with many orders of chivalry, with the military, as well as with some civil orders. Constantine the Great adopted as his standard (*labarum*) the two first letters in the Greek word, Christ. This combination in many varied forms is known as the "Sacred Monogram" or "labarum of Constantine."

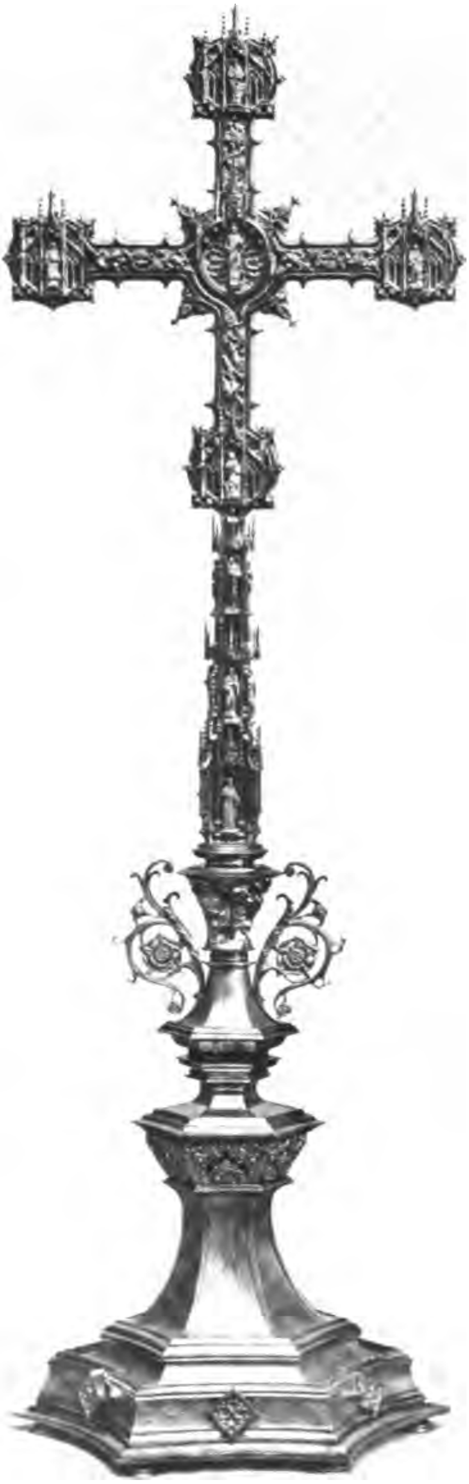


Sacred monogram crosses (according to Schoenmark's "Der Krusifixus").

In architecture the cross is a very favorite form for finials. It is found in stone, wood and



Processional cross

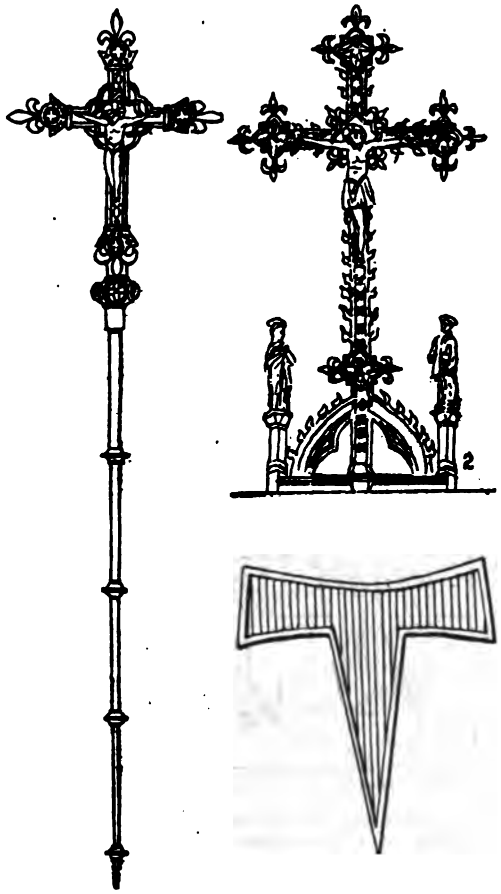


Courtesy Gorham Co., New York

Altar cross

iron, on gables, steeples, etc. Many very beautiful forms are to be seen on the older churches.

Ecclesiastical Crosses.—The principal forms of crosses used in the Catholic Church are: Crux immissa or capitata (†), or Latin cross. The Greek (+) cross. Crux decussata (X), (so termed because it was the figure for the Latin *decus*, 10) or Saint Andrew's cross. Crux commissa (T) or tau cross (its form is that of the Greek T, *tau*), dedicated to Saint Anthony. The earliest location of the Christian cross was crowning the *ciborium* (altar baldachin), where it is still in some Romanesque basilicas. At times it hung from the top of the ciborium; but with the omission, later, of the altar baldachin, the cross was placed in the centre of the altar (see ALTAR), or was displayed on the rear wall. In the Constantinople Council (680) the bleeding Lamb, heretofore figuring on the symbolic crucifix, was forbidden, and the dying Savior's image on the cross was ordered to take its place, thus originating the present form of crucifix to be displayed to the public.

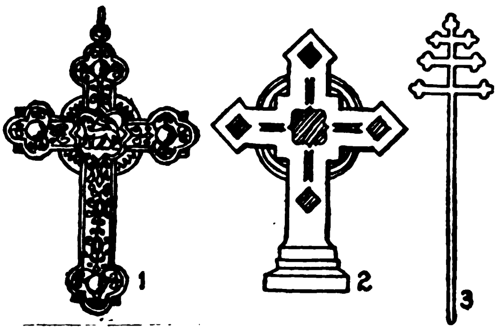


1. Processional cross. 2. Rood cross. 3. Cross of the order St. James of France.

Reliquary Crosses.— In the very early days of the Church, already, relics of the saints were being enshrined. The different churches emulated one another in obtaining relics of greater distinction than others, and in enshrining them in reliquaries each more elaborate and rich in gems and workmanship than the others. Nothing was more natural than that the altar cross should itself become a container of holy relics.

Rood Crosses.— Between the nave and the choir of large churches, or between the nave and chancel of small churches, were lofts or beams since very early days. Codin (15th century), in his history of Constantinople, tells of a cross of gold which stood over the Jubé of Saint Sophia's; it was enriched with precious stones and was provided with sconces for lights. Every jubé or rood loft became embellished with its rich rood cross. Anastasius mentions (8th century) such a cross in the middle of the church of Saint Peter the Apostle, at Rome, made of pure silver weighing 72 pounds. Both the Greek and Latin churches all had such *roods* until quite recent times. In Flanders were many up to the period of the present war, notably one at Louvain. They were usually constructed of wood (carved oak, mostly). Facing the nave, the four ends of the crucifix contained emblems of the four Evangelists, enclosed in quarterfoils; toward the choir faced the four «doctors» Saints Jerome, Ambrose, Augustine and Gregory). At the foot of the cross are found the Blessed Lady and Saint John on pedestals. The entire structure was gilded and painted.

Processional or Station Crosses.— In the Middle Ages, on certain religious processions, the altar cross was carried in advance of the clergy and, at some fixed places called *stations*, the procession stopped. The cross was then lowered to receive the devout kisses of the populace. From this act arose the special processional cross (*crux stationalis*) which was mounted on the end of a staff and carried aloft. These crosses often were furnished with two lighted torches for night processions. On the arms were, frequently, the Greek letters Alpha and Omega (first and last letters of the alphabet), one on each arm, to signify «the Beginning and the End.» Lastly, these crosses received the image of the crucified Savior, also medallion decoration with bas-relief representations of scenes taken from the Old and New Testaments, often chased or painted. The medallions of these elaborate, often richly bejewelled, processional crosses, were termed *mancusa*.



1. Pectoral cross. 2. Stone steeple cross, St. Peter's, Montrouge. 3. Papal cross.

Pectoral Crosses.—A ritualistic cross worn by bishops suspended round the neck by a chain hangs, as the name implies, on the breast. This pectoral cross acted as insignia of authority over a diocese, hence “when any bishop enters the diocese of another he wears the cross concealed.” (Pugin).

Reliquary crosses of small size were made for use of the general public as amulets, and were extremely popular in the Middle Ages. They were termed *encolpia*. Cardinals and archbishops, for hierarchical distinction, are empowered to use a Latin cross furnished with two arms (*patibula*) or traverses. A special, distinctive three-barred cross is dedicated, solely, for the use of the Pope. These two styles of cross are known respectively as *patriarchal* and *papal* crosses.

Heraldic Crosses.— It is said that the knight Crusaders, in their armor and with their faces hidden by helmets, would have been unrecognizable by their followers had they not adopted different kinds of crosses to attach to their persons. This condition is generally referred to as the origin of the numerous kinds of crosses used in heraldry. There are no less than 300 different devices and forms known among the crosses of heraldry, and each has its own *blazon* or titular description. When a cross in heraldry is mentioned without any further blazon it implies the Greek cross. See Heraldry.

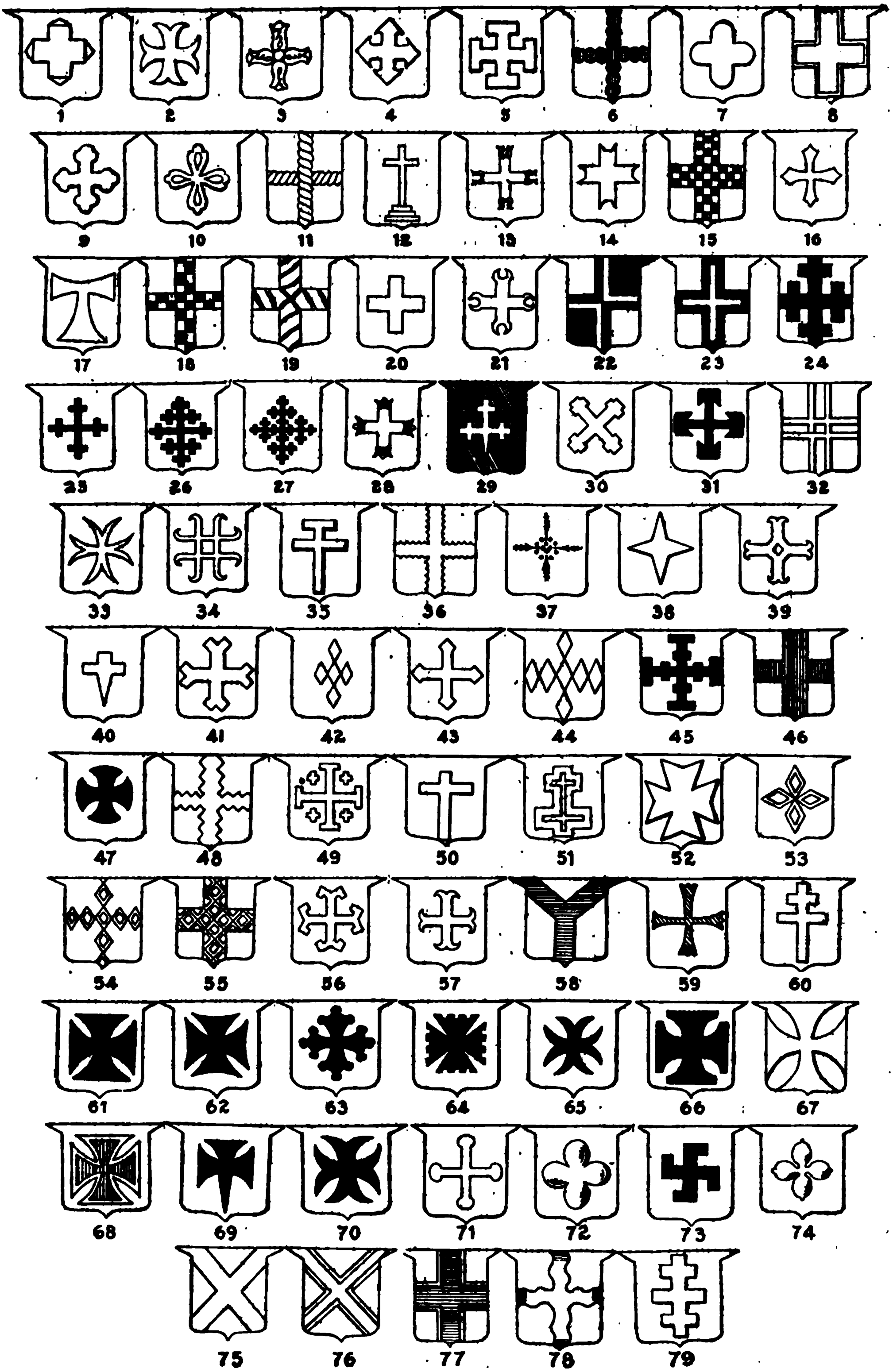
Market crosses are crosses which were erected in the markets or trading places to remind people so to deal with their customers as to be Christ-like. Most market-towns in England and Scotland formerly had their crosses, and many of them are still in existence. Some of the chief are those of Bristol, Chichester, Cheddar, Edinburgh, Malmesbury and Winchester.

Crucifix, a cross bearing the figure of Christ. It cannot be said at what time this emblem of the Christian faith began to be used, either by the Christian Church or by individual Christians. A general feeling of repugnance toward the instrument of punishment which, among the Romans, was reserved only for the most infamous class of criminals, would for a long time prevent the early Christians from representing Christ upon the cross, and this feeling would have to be conquered before the crucifix could come into use in public worship. There are certain remains which would seem to show that crucifixes existed in the beginning of the 3d century; but it is probable that all these were merely tokens of individual piety. It is certain that the most ancient crucifixes known to exist belong to this class. Such, for example, is that painted in the Syriac evangelistary of the year 582, contained in the Laurentian Library at Florence; and such also is the pectoral cross of the superiors of Monza, which is said to have been a gift of Pope Gregory the Great to Theodolinda, who founded the cathedral. Crucifixes appear to have been first used in public worship toward the end of the 6th century. The most ancient example known of a crucifix used for this purpose is one which, on the testimony of Saint Gregory of Tours, was painted in a church at Narbonne. For more than 100 years after this period they were still rare, and it was not till after the Trullan Council, held at Constantinople in 692, which ordained that historic painting should be preferred to emblems or symbolical figures, that the images of Christ crucified began to multiply. As to the manner of representing Christ on the cross it appears to be unquestionable that, as a rule, the figures on the most ancient crucifixes were engraved on gold, silver or iron crosses. On the pectoral cross of Monza, however, the figures are enameled on a gold cross. At a later period they were painted on wood, and it is only in the 9th century, in the ponti-

Suppedaneum crucifix found in catacomb of Pope Julius.

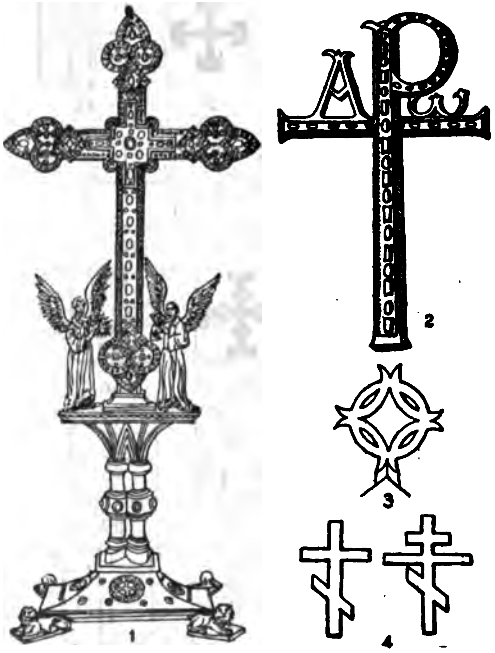
CAPTIONS OF HERALDIC CROSSES.

(1) Cross aiguisée or urdée. (2) Cross ancrée. (3) Cross avellane. (4) Barbed cross. (5) Baton cross or cross potent. (6) Cross bezantée. (7) Cross blunted. (8) Bordered cross. (9) Cross botonnée or treflée. (10) Cross botonnée pattée. (11) Cross cabled. (12) Cross Calvary, cross of Christ or cross of the Passion. (13) Cross catoosed. (14) Cross chappée or cross double fitchée. (15) Cross chequey. (16) Cross clechée. (17) Cross commisse, tau cross or cross of St. Anthony. (18) Cross componée counter componée. (19) Cross corded. (20) Cross couped or humettée. (21) Cross crescented. (22) Cross counter quartered. (23) Cross coursie voided. (24) Cross crenellée or cross bretessed. (25) Cross crosslet or cross crosell. (26) Cross crosslet crossed. (27) Cross crosslet double crossed. (28) Cross crowned. (29) Cross crosslet fitchée. (30) Cross crosslet in saltier or cross of St. Julian. (31) Cross crosslet pattée. (32) Cross double parted. (33) Cross double parted flory. (34) Cross double parted voided. (35) Cross double portante or cross patriarchal. (36) Cross engrailed. (37) Cross erminée. (38) Cross étoile. (39) Cross fer de moline pierced lozengy in the field. (40) Cross fitchée. (41) Cross furchée. (42) Cross fusil. (43) Cross fusil at each end. (44) Cross fusily. (45) Cross gemelle or cross potent crossed. (46) Cross of St. George. (47) Cross globical pattée. (48) Cross indented. (49) Cross of Jerusalem. (50) Long cross. (51) Cross Lorraine voided. (52) Cross of Malta. (53) Cross mascle. (54) Cross mascley or cross of mascles. (55) Cross masculy. (56) Cross miller. (57) Cross moline. (58) Pall cross. (59) Cross patonce. (60) Patriarchal or double cross. (61) Cross pattée or formée. (62) Cross pattée blemished or concaved. (63) Cross pattée botonnée or cross Toulouse. (64) Cross pattée crenellée. (65) Cross pattée fitchée of all four. (66) Cross pattée double rebated. (67) Cross pattée entire. (68) Cross pattée fimbriated. (69) Cross pattée fitchée. (70) Cross pattée moline. (71) Cross pommetée or pommelée. (72) Cross of four pomels. (73) Cross potent rebated, same as swastika. (74) Cross quaterfoil. (75) Cross saltire or saltier. (76) Cross saltire voided. (77) Cross surmounted of another. (78) Cross undée or wavy. (79) Papal cross.



HERALDIC CROSSES
(See description on preceding page)

ficate of Leo III, that the figure of Christ appears carved upon the cross in bas-relief. Although there can be no doubt that Christ, in accordance with the Roman custom of representation, was crucified naked, all the most ancient crucifixes, almost without exception, represent him as clothed with a tunic reaching down to the feet. This practice lasted down to the 8th century, when it began to be modified, the body of Christ being no longer covered above the loins; and at length it became the custom to represent Christ, as in the crucifixes of the present day, entirely naked with the exception of a cloth about the loins. Another point in which the ancient crucifixes differ from modern ones is as to whether Christ is represented dead or alive. Until the 11th century he is represented alive; since that period he has been represented as dead. The first example of Christ being represented as dead is furnished by a manuscript in the Laurentian Library at Florence, belonging to about the year 1059. In the earlier crucifixes, also, the number of nails by which Christ is fixed to the cross is four, one through each hand and each foot, while in the more modern ones there are only three nails, one foot being laid above the other and a single nail driven through both.



1. Altar cross. 2. Stone Alpha-Omega cross. 3. Stone gable cross, St. Urban's church, Unterlimburg. 4. Two Russian crosses, with Suppedaneum.

Seymour says: «In the 8th and 9th centuries the feet (of the crucified Saviour) are fastened with nails, the hands outstretched as in the act of benediction or prayer, yet generally free. At times this is reversed, the hands are fastened and the feet, woundless, are supported on the *suppedaneum*.» In the Greek and Russian churches a form of *suppedaneum* is represented as oblique. The reason given is the legend that one foot of the Crucified One, when suffering, was drawn higher than the other. «The name *sudarium* has been given to the little cloth attached to the crucifix in several countries because of its primitive employment having been to save the metal of the crucifix from the perspiration of the hands of its carrier.» (Cahier). Many crucifixes bear also the inscription put upon the cross by the order of Pilate, but this is always found in an abbreviated form, both in ancient and modern times. In the Latin Church it is frequently omitted, but the Greek Church has adhered more strictly to this practice. Various accessories are also sometimes found in crucifixes, such as figures of the sun and moon, the lamb, of the Virgin Mary and Saint John, of the two soldiers — one presenting the vinegar for Christ to drink, the other with the lance with which he pierced the side of Christ; emblematical figures representing the four evangelists; angels in a posture of adoration and certain saints.

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CLEMENT W. COUMBE.

CROSSWELL, Edwin, American journalist: b. Catskill, N. Y., 29 May 1797; d. Princeton, N. J., 13 June 1871. His able management of his father's paper, the Catskill *Recorder*, led Martin Van Buren and other prominent Democrats to invite him to become editor of the Albany *Argus*, and also State printer 1824. During his 30 years' control he made it one of the most influential Democratic papers in America, and as a member of the political group known as the «Albany Regency,» he preserved order in the party ranks through the columns of his paper. He was a great antagonist of Thurlow Weed. His articles were regarded as authoritative and were widely copied. Subsequently he found himself opposed to Van Buren and other early friends, and leaving journalism (1854) went into business in New York.

CROSWELL, Harry, American writer and clergyman: b. West Hartford, Conn., 16 June 1778; d. New Haven, Conn., 13 March 1858. He first came into notice as a Federalist editor of *The Balance*, a newspaper published in Hudson, N. Y. (1802), his bitter and sarcastic editorials involving him in numerous libel suits. Alexander Hamilton's last, and one of his finest, forensic efforts, was made in defense of Croswell in a suit caused by an article on Jefferson. He entered the Episcopal ministry in 1814, became rector of Trinity Church, New Haven, Conn., 1815, and remained there until his death. He published 'Young Churchman's Guide' (1838); 'Family Prayer' (1843); 'Memoir of Rev. W. Croswell' (1853); 'Guide to the Holy Sacrament' (1857).

CROTALARIA, krō-ta-lā'rĭ-ą, or **RATTLE-BOX,** a genus of annual and perennial herbs and some shrubby plants of the natural order *Leguminosæ*. The numerous species are widely distributed in the tropical and temperate zones, in the former of which some of the tall growing straight-stemmed species yield a textile fibre. The most important of these species are *C. juncea*, which yields the Sunn hemp of India, and *C. tenuifolia*, by some botanists considered a variety of the preceding species, which yields Jubblepore hemp. These plants are grown thickly in order to produce attenuated stems with long strands of fibre. If sown thinly they branch freely. Several American species are reputed to cause trouble (crotalism) to horses which eat them too freely. A few species are cultivated for ornament both out of doors and in greenhouses. The most popular outdoor species is probably *C. retusa*, a hardy annual herb about one and a half feet tall and bearing racemes of yellow and purple rather fragrant flowers during summer.

CROTALIDÆ, krō-tal'ĭ-dē, a family of poisonous snakes, the rattlesnakes or pit-vipers. It is now reduced in classification to the rank of a sub-family (*Crotalinæ*) of the viper family (*Viperidæ*), differing from typical vipers by the presence of a deep pit, of unknown function, between the eye and the nose, and by the possession by most species of tail-rattler. The group is exclusively American, and includes the rattlesnakes, copperheads and moccasins (qq.v.).

CROTHERS, Samuel McChord, American clergyman and essayist: b. Oswego, Ill., 7 June 1857. He was graduated at Princeton in 1874 and from the Union Theological Seminary. After holding several charges in the West, he entered the Unitarian ministry and removed to Brattleboro, Vt., in 1882. In 1894 he was called to the First Parish of Cambridge, Mass., where he became also one of the preachers to Harvard University. His essays are humorous and shrewd, and he is happiest when dealing with the intellectual weakness and frailties of the time. His works include 'The Gentle Reader' (1903); 'The Pardoner's Wallet' (1905); 'The Endless Life' (1905); 'By the Christmas Fire' (1908); 'Among Friends' (1910); 'Humanly Speaking' (1912); 'Three Lords of Destiny' (1913); 'Meditations on Votes for Women' (1914).

CROTON, a genus of plants of the family *Euphorbiaceæ*, consisting of about 600 species in the warmer parts of the world, chiefly in America. Several are natives of the United States. *C. tiglium*, an Asiatic species, is the croton-oil plant or physic nut, which yields the powerful purgative croton oil. *C. eleuteria*, cascarilla or sweetwood, found in the Bahamas, and *C. cascarilla*, yield cascarilla bark. The plants commonly cultivated in hothouses under the name Croton belong to the related genus *Codiæum*.

CROTON AQUEDUCT and CROTON DAM, an aqueduct and dam for many years the only means of water supply for the city of New York. The waters of Croton Lake, an artificial body of water formed by damming the Croton River, were first conveyed to the city in 1842, by what is known as the old aqueduct, and a new aqueduct was opened in 1890. The old aqueduct was of masonry lined with brick, and had a cross-section area of 53.34 square feet, and a nominal capacity of 72,000,000 gallons per day. On occasions it has actually delivered 95,000,000 gallons in 24 hours. (See AQUEDUCTS). The new aqueduct has a cross-section area of 155.57 square feet, and a flow capacity of 300,000,000 gallons per day. It passes in its lower course under the northern part of Manhattan Island rising at 135th street, where a gatehouse is constructed from which the water is distributed through 12 lines of 48-inch iron pipe, four of which enter the reservoir in Central Park. Throughout its entire length this great tunnel was blasted out of solid rock, with the exception of three or four spots where «blow-offs» were constructed with the object of rapidly emptying the aqueduct — which here meets the surface — for the purpose of examination, repair or cleansing. The tunnel is lined throughout with brick, and in one or two places where the rock has been found imperfect and a leakage is possible an iron lining has been added.

As early as 1881 the question arose of providing a large water-supply for the future needs of the city, and a new dam across the Croton River was ultimately decided on, the contract for the structure being awarded 26 Aug. 1892, the work to be completed 1 July 1899. It was not finished, however, until 1906. In 1901 the dam was about half completed and a modification of the design at that time involved doing away with the proposed earthen section of the dam and building the whole of masonry, except a low embankment at the south end. The dam crosses the valley about three and a fourth miles above the mouth of the Croton. The first step in its construction was the cutting through solid rock of a canal 1,100 feet long and 125 feet wide to turn aside the river. The foundation pit for the dam was finished in September 1897. The excavation reached about 75 feet below the country level at the centre of the valley to bed-rock, and involved the removal of 1,821,400 cubic yards of earth and 400,250 cubic yards of rock. The dam is 1,168 feet long and 294 feet high, from its foundation, and 210 feet above the former level of the river, the width at the base being 206 feet, from which the structure tapers to 22 feet at the top. At the north end of the dam is a spillway or overflow, 1,000 feet long, built in continuity with the dam and nearly at right angles to it, reaching up the valley. The waste from this spillway is discharged into a channel 50 feet wide at its upper end and 125 feet at the lower end, cut into the solid rock. At the southern end the masonry of the old aqueduct runs through the dam. This great mass of masonry forms the largest and most expensive dam ever constructed on this continent and its height is second only to that of the Shoshone irrigation dam (324 feet), which, however, contains less than half the mass of the Croton dam. The steam and machinery equipment equaled that of an ordinary railroad, for besides the many hoists and derricks, there were used several miles of tracks and 11 locomotives of the dinky type and 282 cars in hauling earth and stone, besides 39 steam boilers and 51 hoisting engines. The new dam increased the storage capacity of the city water supply by 30,000,000,000 gallons. The old Croton dam impounded 2,000,000,000 gallons in a lake 5½ miles long and covering 500 acres. This old dam now lies 30 feet below the level of the new lake. The new dam forms a lake 19⅔ miles long covering 3,425 acres. The watershed of the Croton River Valley has an area of about 340 square miles. In this area there are a dozen or more reserve dams auxiliary to the Croton dam, and these impound a total of 67,952,000,000 gallons, making the capacity of the Croton system close to 100,000,000,000 gallons. The intake from the large new reservoir is from the upper gatehouse where there are 22 gates each supplied with charcoal-filters through which the water must pass before it is turned into the aqueducts. These intakes have a capacity of 400,000,000 gallons a day.

CROTON BUG. See COCKROACH.

CROTON OIL, a fixed oil expressed from the seed of *Croton Tiglium.* (See CROTON). The seeds have been used in medicine for a great many years. The oil is a thick, viscid, pale yellowish or brownish-yellow liquid, having a slight fatty odor and an acrid burning taste. Its solubility is like that of similar fixed oils. Its composition is extremely complex, but the active principle is chiefly a glyceride of crotonoleic acid; this makes it an extremely powerful irritant, and administered to the skin it causes vesication and pustulation. Given internally it is a very active, drastic purgative and is used practically only in obstinate cases of constipation and for the insane, who refuse to take internal medication. It should be administered very sparingly, as five drops have been known to cause severe poisoning.

CROTON RIVER, river in New York which rises in Dutchess County, runs south through Putnam County and southwest through Westchester County, emptying into the Hudson at Croton Point, 32 miles north of New York. Its length is nearly 60 miles. It supplies the city with water through the Croton aqueduct (q.v.). The area of the Croton watershed is about 362 square miles above the new Croton dam. Within this area are about 30 lakes and ponds, many of which are utilized as natural storage basins. Along the course of the river the following reservoirs are situated: the Boyd's Corners, the Middle Branch, the East Branch, the Titicus, the Carmel and the new Croton. For many years New York (i.e., the present Borough of Manhattan) was dependent chiefly upon this source for its water supply. For an account of the city's enlarged water-supply system see CROTON AQUEDUCT.

CROTONA, Italy, a Greek republic in Magna Græcia or South Italy, founded about 700 B.C. Livy gives the circumference of the city of Crotona at 12 miles. This city was famous for producing the strongest athletes, among them the celebrated Milo. It is still more celebrated as the city where Pythagoras settled between 540 and 530 B.C., and where he taught. Milo was one of his disciples. After the destruction of Sybaris (510 B.C.) the Pythagoreans were expelled. The city was captured by Dionysius the Elder of Syracuse and later by Agathocles and in the war between Pyrrhus and the Romans was plundered and nearly destroyed. It suffered severely in the Second Punic War, and was for three years the winter quarters of Hannibal. Under the Romans Crotona was notorious for its luxury and dissoluteness. Crotona is the modern Cotrone, and the ruins of the ancient town are still to be seen above Capo della Colonna. Pop. (commune) about 9,000.

CROTOPHAGA, krō-tŏf'a-ga, a genus of birds, the typical one of the sub-family *Crotophaginæ.* The bill is greatly compressed, and the ridge of the upper mandible keeled. The species are found in South America. *C. ani* is the ani or anno so called by the Latin races of South America, the razor-billed blackbird of Jamaica, called also the savannah bird and the great blackbird. It feeds on small lizards, insects and seeds. It lives in flocks, and when one individual is slain the rest gather again almost at the same spot. Several females are said to use the same nest.

CROUCH, Frederick Nicholls, English musician: b. London, 31 July 1808; d. Baltimore, Md., 10 Aug. 1896. He played the violoncello in Queen Adelaide's private band and later was principal violinist at Drury Lane Theatre. In partnership with others he established a large rolling mill for the manufacture of zinc, and patented the engraving process known as zincography. He composed 100 songs, including the famous 'Kathleen Mavourneen.' In 1849 Crouch visited New York and played in the orchestra at Astor Place Opera House; taught music in Portland, Me., 1850–56. He fought on the Confederate side in the Civil War. He also composed two operas, 'Sir Roger de Coverley' and 'The Fifth of November 1670.'

CROUP, a term popularly used for a number of conditions which have been more specifically defined. It is in reality a symptom present in a large number of diseases or disorders of the larynx, which are spasmodic or inflammatory. Croup occurs mostly in children and is characterized by the peculiar strident sound, sometimes a distinct cough, which accompanies inspiration or expiration due to interference with the passage of air through the vocal cords because of spasm, inflammation or growth affecting the larynx, vocal cords or adjacent tissues. The term has been popularly used to denote a diphtheritic laryngitis (acute membranous laryngitis), which however, belongs distinctly to that disease. (See DIPHTHERIA). It is also used generally for acute catarrhal spasm of the larynx (catarrhal croup, false croup, spasmodic croup, laryngitis stridulosa). This is common to childhood and may follow a slight coryza, dietetic disturbances or sometimes comes on without any apparent premonitory symptoms. The attack comes on suddenly and usually at night. The respiration is obstructed and consequently labored with a peculiar strident inspiration and there may be extreme cyanosis. There is a loud metallic cough. The pulse is small and rapid and there is usually a marked rise in temperature. The attack lasts several hours when the child gradually becomes easier and falls asleep. The attack may be repeated several successive nights after which a slight catarrh remains for a week or two and then disappears. The most effective means of treatment is by the use of steam inhalations with warmth and rest in bed. Occasionally in more severe cases other means of treatment may also be used. Although the attacks are frequently very alarming fatality is extremely rare. Attention should be given to certain prophylactic measures in the child disposed to this form of attack. Exposure should be avoided but the child should not be kept in too warm an atmosphere or one deprived of some amount of moisture. The condition of the tonsils and adenoids should be ascertained as these will often be found enlarged. There is also an acute simple laryngitis which is more serious but less frequent than laryngitis stridulosa. It is often associated with infectious diseases of childhood or with coryza or inflammation of some adjacent portion of the respiratory tract. Recovery is usual in a few days or two weeks. Sometimes the inflammatory process extends to the bronchial tubes or even develops into bronchopneumonia. A laryngospasm, known as laryngismus stridulus (cerebral croup), occurs chiefly in infants under 18 months of age who are rachitic or have a tendency to convulsions. It manifests itself in a sudden attack of apnœa followed by a protracted crowing inspiration and ending in crying and fretfulness with perhaps a general convulsion.

This form especially marks the psychogenic origin of croup, which is not absent likewise from the more general conditions already described. They call attention to the presence of a neurotic diathesis which determines such a mode of response by which the infant seeks to express the lack of conformity between its individual power seeking and the demands of environment. Diphtheritic laryngitis represents such a reaction upon the level of physicochemical activity and has therefore found its place among the distinctly infectious conditions. Laryngitis stridulus also manifests disturbance of the vegetative nervous functions. In all of these forms the psychogenic factor finds its separate mode of control. This is further emphasized by the fact that as the tendency toward these forms of reaction diminish, thumb-sucking, enuresis or other psychoneurotic manifestations become substituted for these more acute symptoms.

Smith Ely Jelliffe.

CROW. The crow family (*Corvidæ*), order *Passeres,* comprises birds that have a strong bill, compressed toward the points, and covered at the base with stiff, bristly feathers, which advance so far as to conceal the nostrils. The plumage is dense, soft and lustrous, generally dark, but sometimes of gay colors. They are very omnivorous, and remarkable for their intelligence. The family, widely diffused over the world, includes the common crow, type of the *Corvidæ;* and the raven, the fish crow, the rook, the jay and the magpie. The common crow of North America, *Corvus americanus* (Audubon), is about 20 inches long, and the wings about 12 inches. It is remarkable for its gregarious and predatory habits. The bill is straight, convex and compressed. The nostrils are placed at the base of the bill, and are pantalous; the tongue short, and bifid at the tip; the toes are separated almost to the base, and the middle one is the longest; the wings sub-elongated and acute, and the tail composed of 12 feathers. They pair in March; the old repair their nests, the young frame new ones; but they are such thieves that while the one is fetching materials the other must keep watch to prevent the rising fabric from being plundered by their neighbors. As soon as the nest is finished and the eggs produced (five, bluish green, with dark blotches), the male takes upon himself the care of providing for his mate, which he continues during the whole period of incubation. They frequent the same rookeries for years, but allow no intruders into their community. They are omnivorous and feed largely upon insects and small animals of all kinds, as well as on grain and seeds, whence they have sometimes been supposed injurious to the farmer; but they amply repay him for what they take by destroying the vermin in his fields. The fish crow (*Corvus ossifragus*) is a closely similar but somewhat smaller species, chiefly maritime in the eastern United States, but found for a considerable distance along river valleys. Less social than the common crow, it often associates with that bird, so that it is very commonly overlooked. In India there is a hooded crow, also of the genus *Corvus.*

CROW-BLACKBIRD, the name of certain American birds of the genus *Quiscalus,* family *Icteridæ* or hang-nests. The great crow-blackbird, or grackle, *Q. major,* found in the Southern States, Mexico and the West Indies, is 16 inches long, and of a glossy black plumage. The female is of a light brown above and whitish beneath. The purple grackle, lesser or common crow-blackbird, *Q. quiscula,* is similar in color to the preceding, but smaller. They reach the Middle States of the United States from the South in flocks in the latter part of March, and build in April in swamp-bushes and trees. In their first arrival they feed upon insects, but afterward commit great ravages upon the young corn. In November they fly south again.

CROW INDIANS or **CROWS,** or **ABSORUQUE** or **ASAROKA,** a tribe of the Sioux division of the North American Indians. They are named after a species of hawk, not after the bird commonly called the crow. They belong to the linguistic stock included under the name Siouan Indians and are of the same family as the Dakotas. After 1750 they remained at peace with both their neighbors and the whites, frequently furnishing troops against hostile tribes. In language and customs they resemble the Hidasta. Their society is founded on a clan system with maternal descent, combined with social usages dependent on the father's clan. They had a series of ungraded military societies, and a strange ceremony of planting the sacred tobacco. It was common for them to be engaged at war with other tribes of the same family. When the explorers Lewis and Clark visited the Crows, they found the tribe divided into four groups or "bands." Brown located them on the Yellowstone River in 1817, and in 1842 they were reported by the government agents as inhabiting the land around the head waters of the Yellowstone. They were then 4,000 in number. Later they were removed to a reservation in Montana. Pop. 2,287. Consult Curtis, 'The North American Indian' (Vol. IX, Cambridge 1909); Lowie, 'Social Life of the Crow Indians' (New York 1912); id., 'Societies of the Crow, Hidasta and Mandan Indians' (ib. 1913).

CROWBERRY (*Empetrum*), a genus of low-growing evergreen shrubs of the family *Empetraceæ*. The few species are characterized by small, crowded, evergreen leaves, inconspicuous blossoms, and globular, usually black, edible berries, with 6 to 10 bony seeds in a slightly acid, very juicy pulp. They are natives of cold, northern climates (one in South America), and are sometimes used for making a fermented beverage. As dessert fruit they have little value, but they are eaten in northern Europe, where they are regarded as a scorbutic and diuretic. Crows are especially fond of them, hence the name. The plants are often used for ornament in rockeries where the soil is moist and peaty or sandy.

CROWE, Eyre, English historical and genre painter: b. London, 3 Oct. 1824; d. there, 12 Dec. 1910. He studied painting in the atelier of Paul Delaroche in Paris, and went with that artist to Rome in 1844. Acting as amanuensis to William M. Thackeray, he visited the United States in 1852–53. He was elected an associate of the Royal Academy in 1876, and an academician in 1888. Among his paintings are 'Goldsmith's Mourners' (1863); 'Blue Coat Subjects' (1872); 'French Savants in Egypt' (1875); 'The Rehearsal' (1876); 'Sanctuary'; 'Prayer'; and 'Bridal Procession at St. Maclou, Rouen' (1877); 'School Treat' (1878); 'Blue Coat Boys Returning from Their Holiday'; 'Marat: 13 July 1793'; 'The Queen of the May' (1879); 'Queen Eleanor's Tomb' and 'Forfeits' in 1880; 'Sandwiches' and 'Sir Roger de Coverley and the Spectator at Westminster Abbey' (1881); 'How Happy Could I Be with Either!' and 'The Defense of London in 1643,' exhibited in 1882; 'Old Porch, Evesham' (1884). He published 'With Thackeray in America' (1893); and 'Haunts and Homes of Thackeray' (1897).

CROWE, Sir Joseph Archer, English historian of art and miscellaneous writer: b. London, 20 Oct. 1825; d. Baden, 6 Sept. 1896. He was long eminent as a journalist, and for a time served in the British diplomatic service. His celebrity rests mainly on the histories of painting in Italy (1864–71), the most important work on this subject, written in collaboration with G. B. Cavalcaselle (q.v.). He also published other volumes on art subjects.

CROWE, William, English clergyman and poet: b. Midgham, Berkshire, 1745; d. Bath, Somerset, 9 Feb. 1829. He was the author of 'Lewesdon Hill,' a descriptive poem, praised by Wordsworth, Coleridge and Moore (1788); 'Treatise on English Versification' (1827), etc.

CROWELL, Edward Payson, American educator: b. Essex, Mass., 1830; d. Amherst, Mass., 1911. He was graduated at Amherst College 1853; was tutor there 1855–56; professor of German 1858–64; and of the Latin language and literature 1858 till his death. He edited many Latin classics, such as 'De Senectute' and 'De Amicitia' of Cicero (1871), the 'De Officiis' of Cicero (1873), and his 'De Oratore' (1879); 'Selections from the Latin Poets, Catullus, Tibullus, Propertius, etc.' (1882), and with Richardson, translated Herman Bender's 'Brief History of Roman Literature' (1880); and wrote 'A Clue to the Prose Writings of the Silver Age' (1897).

CROWELL, John Franklin, American economist: b. York, Pa., 1 Nov. 1857. He was graduated at Yale in 1883, and studied also at Columbia and at the University of Berlin. He was principal of Schuylkill Seminary, Fredericksburg, Pa., for several years; president of Trinity College, N. C. (1887–94); head of the department of economics and sociology at Smith College (1895–97); and in 1900–04 an expert for the United States Industrial Commission, writing one of the 19 volumes issued. He was also expert on internal commerce for the Bureau of Statistics in the Treasury Department. In 1906 he became editor of the *Wall Street Journal*, New York, and in 1910–11 was president of the American Civic Alliance. He is now an executive officer of the New York Chamber of Commerce. He has published 'Taxation in the American Colonies'; 'The Logical Process of Social Development'; 'Trusts and Competition' (1915); 'The Distribution of Farm Produce in the United States'; 'Report to the War Department on Deepening the Mississippi River' (1903); and many contributions to the *Monthly Summary of Commerce and Finance of the United States*.

CROWFIELD, Christopher, a pseudonym sometimes used by Harriet Beecher Stowe.

CROWFOOT, or BUTTERCUP, common names of the genus *Ranunculus*, the typical genus of the natural order *Ranunculaceæ* or crowfoot family. The genus has over 200 species, widely distributed in the temperate regions of the world, and on the mountain-tops of the tropics. The plants of the genus are both aquatic and terrestrial, and are generally classed as useless weeds. The name buttercup is popularly applied in the United States to those species with large flowers and divided leaves. The buttercup is called "crazy" by the rustics of central England, who believe that its smell will cause madness.

CROWLAND, or CROYLAND, England, town in the county of Lincoln, eight miles northeast of Peterborough; pop. about 2,800. It is in the Fen country, and consists of four principal streets, at the intersection of which is a very curious ancient triangular bridge. On one of the wings of this is a dilapidated statue, attributed to the 9th century, and supposed to be that either of Alfred or Ethelbald, king of Mercia. The only other remarkable edifice is the ruined abbey of Crowland founded in 714 and rebuilt about 1112, the north aisle of which forms the parish church. Ingulphus, to whom a history of the abbey of Crowland, first published at London in 1596, afterward at Oxford in 1684, has erroneously been attributed, was abbot of Crowland from 1075 till 1109. Pop. 2,683.

CROWLEY, La., town and county-seat of Acadia Parish, on the Southern Pacific and Louisiana Western railroads, about 135 miles northwest of New Orleans, and 45 miles from the Gulf. It is the centre of a rice district, and nearby are oil fields. Rice-milling is the principal industry. A rice-growing experiment station was established here under State and Federal control. Settled about 1887, Crowley was incorporated two years later and grew rapidly. The government is administered by a mayor, elected biennially, and a council. The town contains an Odd Fellows' Home and owns the electric plant, sewerage system and waterworks. Pop. 5,099.

CROWN, an official or symbolical ornament worn on the head, now the symbol of royalty. At first it had no regal significance and was nothing more than a garland of leaves or flowers bestowed on athletes. Later it was made of gold and was bestowed on citizens deserving well of their country.

In the Middle Ages crowns became exclusively appropriated to the royal and imperial dignity; the coronets of nobles were only borne in their coats of arms. It is, however, with the eastern diadem rather than with the classic corona that the crown as a symbol of royalty is connected; indeed, it was only introduced as such a symbol by Alexander the Great, who followed the Persian usage. The English crown has been gradually built up from the plain circlet with points. This form was elaborated and jeweled, and finally arched in with jeweled bands (diadems) surmounted by the cross and mound. As at present existing the crown of England is a gold circle, adorned with pearls and precious stones, and bearing alternately four crosses, pattées and four fleurs-de-lis. From the top of the crosses rise imperial arches, closing under a mound and cross. The whole covers a crimson velvet cap with an ermine border. The Scottish crown consists of a jeweled and enameled circle of gold, supporting 10 fleurs-de-lis and 10 crosses fleury in alternation. Each of the crosses is adorned with a diamond and pearls, and from them rise four gold arches, closing under a mound, which bears a pearl-bedecked cross pattée. The royal crown of France is a circle ornamented with eight fleurs-de-lis, from which rise as many quarter-circles closing under a double fleur-de-lis. The Austrian crown is a sort of cleft tiara.

2. The term crown is used figuratively for the royal power, in contradistinction either to the person of the monarch or to the body of the nation, with its representatives, interests, etc. Thus, in modern times, the word crown is used to express the rights and prerogatives of the monarch considered as a part of the state, which includes all powers — the legislative, judicial, etc. Thus the Crown domains are distinguished from the state or national domains.

3. In architecture, crown denotes the uppermost member of a cornice; the corona; also a sort of ornamental structure surmounting a tower and formed by flying buttresses meeting together at top.

4. In English money, the crown is a coin, worth five shillings, or $1.22.

See Crowns and Coronets; Corona; Wreaths.

CROWN COLONIES. British colonies are officially divided into three classes; those coming under this head are colonies which were ceded or conquered, and where the Crown, i.e., the home government, has the entire control of legislation and of the officials, such as Gibraltar. A special department of the Colonial office in London deals with the administrative and political work of the Crown colonies and protectorates.

CROWN-GALL, a disease of many fruit and forest trees usually caused by *Bacterium tumifaciens,* which obtains entrance usually at the juncture of the roots and the trunk (the crown), but sometimes appears upon the roots. In young trees the galls are often half an inch in diameter, colored like the roots or darker, soft and composed of apparently unorganized tissue, but in old trees they frequently show concentric rings and may become several inches in diameter. In Europe, America and New Zealand, where this disease is known, considerable damage has been reported, even whole orchards being destroyed by the fungus. The only remedy thought to be of service is the annual removal of the galls and the covering of the wounds with thickened Bordeaux mixture.

CROWN GLASS, very hard and clear, made almost entirely of sand and alkali and a little lime, without lead or any metallic oxide except a very small quantity of manganese, and sometimes of cobalt. The original balloon is flattened, crown-shaped. A steel rod tipped with molten glass is now attached opposite to the blowpipe which latter is then removed. By rapidly revolving the rod on a horizontal axis opposite the large opening of the glass furnace, the mass of glass softens and spreads out into a disc, thick at the centre and thinning toward the edges. The limit of the diameter of these discs is about four feet. Crown glass is used in connection with flint-glass for optical instruments, in order to destroy the disagreeable effect of the aberration of colors. This important discovery by Dollond, who turned it to admirable account in the achromatic telescope, was carried to the highest perfection by Reichenbach. This glass is much used for windows, especially for art work, where its peculiarly brilliant surface makes it most acceptable. See Glass, Varieties of.

CROWN LANDS, English, territories in the British Isles formerly the private property of the sovereign. Since George III, however, every British monarch has on accession surrendered the Crown lands to be disposed of by Parliament. The income from them, like the other revenues of the state, are now devoted to the public service. The administration thereof is in the hands of the commissioners of woods, forests and land revenues. The produce for 1915–16 amounted to $3,912,720, of which sum $2,750,000 was paid into the Exchequer. Before the Norman conquest (1066) all the so-called folk-land gradually became *terra regis* or king's land. The confiscations of William the Conqueror greatly increased these terrains, but their redistribution among the king's followers so reduced them again that an Act of Resumption was passed under Henry III, and during the reign of Edward II an act was in force prohibiting the alienation of Crown lands.' The Wars of the Roses and the confiscations of Henry VIII enlarged the possessions by forfeiture and seizure, but the necessities of James I and Charles I compelled the disposal of the whole estates. These were partially recovered at the Restoration by the sales being declared void. An important constitutional effect was produced by the wholesale granting away of the Crown lands; being thus deprived of a private income, the monarch had perforce to apply to Parliament and the nation for his income, which was not infrequently granted only on condition of good government. The extravagance of William III led to an act being passed in the reign of Queen Anne (1702–14) by which further alienation was greatly checked, but in 1800 the act was declared not to apply to the private property of the sovereign acquired by purchase or inheritance from any person other than a sovereign of England. In 1910 the Civil List of the king was fixed (after the usual surrender of hereditary revenues, i.e., the Crown lands) at $2,350,000.

CROWN POINT, a town in Essex County, N. Y., on the west shore of Lake Champlain, on the Barge Canal and on the Delaware and Hudson Railroad, 110 miles northeast of Albany. It has a large park, a library and chapel and a memorial lighthouse erected to Samuel de Champlain. The town manufactures building materials, sashes and doors and has spar mills, grain elevators and a creamery. Crown Point was first visited by Champlain, who fought and defeated the Iroquois there. In 1714 it became an important English trading station. This place, because of its location near a narrowing of the lake, was called Pointe à la Chevelure (Scalp Point) by the French, Crown Point by the English. In 1726 the French established a post opposite, on the east side of the lake; they withdrew in fear of Massachusetts. In 1631, the governor of Canada built a fort there, which they called Fort Frédéric. In 1755 at the opening of the final contest, an expedition against Fort Frédéric was planned by Governor Shirley of Massachusetts, and led forward by Sir William Johnson; but it got no farther than Fort Edward, and ended in the bloody drawn battle of Lake George (q.v.). In 1756 the French built Ticonderoga farther down, on the isthmus between Lake Champlain and Lake George; this left Crown Point a second instead of first line of defense, but the two were the chief French frontier posts through the war. In 1756 an expedition from Albany against them was undertaken, but came to nothing; in 1757 Maj. Robert Rogers' rangers attacked them, in numerous raiding parties. In 1759 they were captured by Amherst, Crown Point being abandoned as soon as Ticonderoga was taken. Both posts were kept up by the British, and at the outbreak of the Revolutionary War were the first thought of the colonists, to open the route to Canada and seize the stores they contained. On 10 May, while Arnold and Ethan Allen took Ticonderoga, Seth Warner captured Crown Point, with over 200 cannon and a quantity of ammunition. The present village of Crown Point is several miles below the point and the old fort. The grounds containing the ruins of Fort Frédéric and Crown Point were presented to New York State for a public park in 1910.

CROWN POINT, Ind., the county-seat of Lake County, in the northwestern corner of the State, on the Erie and the Pittsburgh, Cincinnati, Chicago and Saint Louis railroads, about 40 miles southeast from Chicago and 15 miles south of Lake Michigan. Among the noteworthy features are the county jail and almshouse, the juvenile home for delinquents and the Carnegie library. The town has grain elevators, wagon works, iron-works and a shirt factory. Pop. 2,526.

CROWNINSHIELD, Arent Schuyler, American naval officer: b. Seneca Falls, N. Y., 14 March 1843; d. 27 May 1908. He was graduated at the United States Naval Academy in 1863, and participated in both attacks on Fort Fisher in the Civil War. Later he rose to the rank of captain. During the war with Spain he was a member of the Board of Strategy. In 1900 he was chief of the Bureau of Navigation, with the rank of rear-admiral; commander European squadron 1902–03; a member of the Board of Naval Strategy, and retired 20 March 1903.

CROWNINSHIELD, Frederic, American artist: b. Boston, Mass., 27 Nov. 1845. He was graduated at Harvard 1866; spent 11 years in Europe studying art under Rowbotham, Couture and Cabanel, his first exhibited work appearing in the Paris Salon of 1878. He was instructor in the Boston Museum of Fine Arts 1879–85, after which he removed to New York, where he was president of the Fine Arts Federation from 1900 to 1909. In 1911 he was appointed director of the American Academy in Rome. He is a member of the National Society of Mural Painters. He devotes himself largely to mural painting and stained glass work. His water colors are greatly admired and sought for by collectors. He has published 'Mural Painting' (1887); 'Pictoris Carmina, a Painter's Songs' (illustrated by himself, 1900); 'A Painter's Moods' (1903); 'Tales in Metre' (1903); 'Under the Laurel' (1907); 'Villa Mirafiore' (1912).

CROWNS AND CORONETS. Crowns may be divided into three classes; they may be either emblems of royalty, insignia of office or authority, or decorations of honor. The insignia of royalty adorning the heads of the ancient Eastern kings (Assyrian, Babylonian, etc.), which in English works usually are termed crowns, were ribbons or bands of linen or silk (sometimes of thin gold) worn round the head and passing over the temples. These were the *diadema.* The *cidaris* of the ancient Persian monarchs was in the form of the Phrygian cap (our cap of Liberty) later copied for the crowns of the old Doges of Venice. The ancient Greeks' crowns of honor were wreaths made from vegetable growths entwined. The Roman Cæsars changed the wreaths as insignia into a circlet or ring of metal. Perhaps the earliest of actual crowns, according to present definition of the term, were those of the Nile kings. The *pshent* combination of Upper and Lower Nile kingdoms was a true crown as differentiated from the wreath or cap of honor. (See Fig. 1). In the 10th century we find the Byzantium emperor with a *closed* crown (arched over).

Historic Crowns.— A number of regal and imperial crowns of old historic interest are still preserved. The Austrian Imperial Crown (Fig. 2) dates back to 1602 (Rudolf II). The Hungarian (Stephan's crown) also belongs to the Austrian Empire's regalia; it dates back to the 11th century. The Bohemian crown («Crown of Wenceslaus») is of the 14th century. The crown of Lombardy or «Iron Crown» dates from the 8th century; it was lost to Austria in 1866, when it was returned to Italy. Most noted of all is the crown of the Holy Roman Empire of Germany.

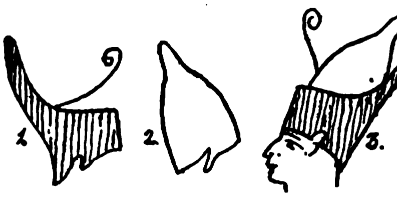


FIG. 1

1. Red crown of Lower Nile. 2. White crown of Upper Nile. 3. Pschent or united crowns of double kingdom.

Descriptions.— The crown of the Holy Roman Empire is of fine gold. It is in the Hofburg in Vienna, and was used by Pope Leo III in crowning Charlemagne at Saint Peter's, Rome, in 800 A.D. This crown consists of eight flat plates rounded at the top and rivetted to an inner frame of two iron octagonal rings. Four plates are studded with pearls and polished, but uncut, precious stones (most are pierced, showing they originate from a pre-Christian necklace probably). The other four plates show gorgeous enamel pictures depicting symbolic and allegoric subjects. The arch (*diadem*) was added by Conrad III in 1147. It weighs seven pounds. The Saint Stephen's crown, known also as the Corona Sancta or Holy Crown of Hungary (recently used at the coronation of Charles I), was sent (1072) by Michael Ducas, emperor of the Eastern Empire, to Geisa, the 1st Duke of Hungary. Its Byzantine style shows its origin. King Stephen (canonized as saint on account of Pope Sylvester II giving him the title of «Apostolic King») was crowned with this «Holy Crown.» It is preserved in the castle at Buda-Pesth and consists of a cap of gold surrounded by a circlet of six plaques hinged together. The edge of these plaques is surmounted by five arched and four triangular plates of gold open-work, decorated with imbrication (scale) pattern, the openings in the metal being filled in with a green enamel (*plique à jour*). In the centre, above a plaque, is an arched-shaped plate depicting, in enamel, an artistic «Christ enthroned.» The plaques forming the circlet show large polished precious stones set in enamel surroundings and, alternately, the Archangels Michael and Gabriel, Saints Come, Damian, Demetrius and George, two Greek princes and a king. Two diadems (arches), supporting a plain cross bottone in the apex, are decorated with enamel medallion figures of Saints John, Bartholomew, Thomas, James, Peter and Philip, Paul and Andrew. The cross leans to one side, whether by accident or with occult intent is unknown. Three *kataseistas* (pendant chains) of flat rubies are suspended from the lower edge of the circlet, two at the sides and one behind after Eastern ancient style. This crown has been used in the coronation of over 50 Hungarian kings. The Bohemian crown, or crown of Wenceslaus, consists of four plates in fleur-de-lis form fastened together by hinges and studded with uncut precious stones. Two arches support a cross and a cap of crimson velvet lines the inside. It is of Byzantine workmanship. The «Iron Crown» or crown of Lombardy, preserved in the cathedral at Monza, is of uncertain origin. The ancient monarchs of Lombardy were crowned with this «Corona Ferrea,» and Napoleon I, with his own hands, crowned himself with this crown. Charlemagne, as king of the Lombards, was inducted with this circlet. Its name is derived from the fact that it contains, in its make-up, a narrow wrought iron band, which tradition says was forged from one of the nails taken from the cross on which our Saviour was crucified. The golden circlet to which the iron band acts as interior frame is composed of six plaques about two and one-half inches wide and hinged together. Each plaque has as decoration a setting of jewels surrounded by floral blooms and foliage of chased and enamel work. The diameter of the jewel is but six inches.

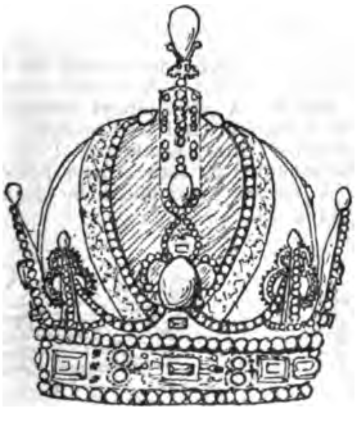


FIG. 2 — Present imperial Austrian crown.

English Crowns.— Early Anglo-Saxon crowns consisted of a circlet of gold with upright spikes or points bearing a ball or «pearl» above. The English kings since Charles II have two royal crowns. One is known as the official Saint Edward's crown and the other is the one used at the coronation ceremony and known as the State or Imperial crown. Saint Edward's crown has two arches (diadems), a circlet with four crosses-patté, four fleur-de-lis alternating. It is composed of gold, enameled and has a few jewels. The present coronation crown of England is of silver or platinum frame closely encrusted with precious stones, some with historic records, taken from former state crowns. The crown of the present king (George V) differs from that of his father (Edward VII) only in having one of the great Cullinan diamonds («Star of Africa») in the circlet. The «State Crown of India,» made for the coronation of George V, at Delhi, contains over

6,170 diamonds as well as other precious stones. The bandeau or circlet supports eight arches rising from four fleur-de-lis and four crosses-patté alternating. The arches support a mound with cross-patté. The upper and lower borders of the circlet consist of diamonds; between these are 16 large clusters, four of emeralds and diamonds alternating with four of sapphires and diamonds, while between each are eight large brilliant clusters, the whole of these being divided by trefoils. The centrepiece contains a 34-carat Indian diamond of great beauty. The eight arches are formed of 48 large brilliants separated by diamond foliation and enclosed with outer bands of diamonds; their fleur-de-lis and cross-patté bases are of diamonds surrounding magnificent Indian rubies.

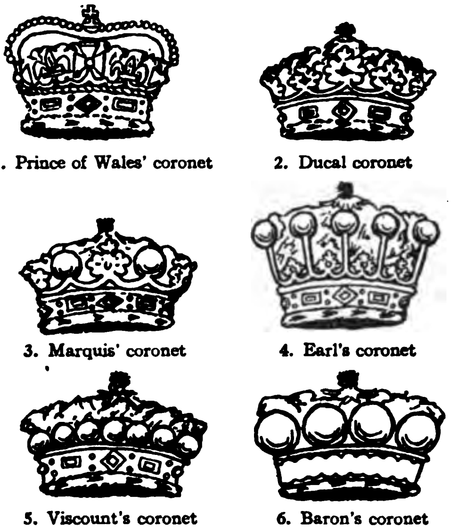

1. Prince of Wales' coronet
2. Ducal coronet
3. Marquis' coronet
4. Earl's coronet
5. Viscount's coronet
6. Baron's coronet

Fig. 3.— English coronets.

English Coronets.— Modern English coronets formerly enclosed a velvet cap with a tassel above of bullion; but these caps are now often omitted in practice. Lodge describes the coronet forms thus: The Prince of Wales' coronet has «cap of velvet, turned up with ermine and having a tassel of gold.» (This authority's illustrations do not follow his rules strictly, as our illustrations show. Fig. 3). «Over it is worn a circlet of gold enriched with jewels; above its upper rim rise four fleur-de-lis and four crosses-patté alternately; from them an arched diadem of gold crosses the head and is finished at top with a ball surmounted by a cross-patté. . . . It is, in fact, the same as the imperial crown, with the difference of having but one diadem.» *Ducal coronet.* «The duke's cap is of crimson velvet, lined with ermine, having a gold tassel on the top. His coronet, worn over the cap, is a circlet of gold enriched with jewels, and set around with eight golden strawberry leaves rising from its upper rim.» *Marquis' coronet.* «His cap and coronet resemble the duke's, differenced only by four of the strawberry leaves on the rim being exchanged for as many golden balls.» *Earl's coronet.* «His cap is the same as the duke's. His coronet is a circlet of gold enriched with jewels, from which rise eight points surmounted by as many balls of gold, and between them eight small strawberry leaves close to the upper rim of the circlet.» *Viscount's coronet.* «His cap is the same as a duke's. His coronet is a circlet of gold enriched with jewels the upper rim of which is surmounted by 16 balls set close together.» *Baron's coronet.* «His coronet is differentiated from that of a viscount by having only six balls upon its rim.»

French Crowns and Coronets.—*King.* A circlet surmounted by eight fleur-de-lis from which arise four arches (*diadems*) that support a double fleur-de-lis. (Fig. 4). *Duke.* A circlet surmounted by eight leaves (*fleurons*). *Marquis.* A circlet bearing four leaves (*fleurons*), a point between each surmounted by a triple pearl cluster. *Count.* A circlet bearing 16 pearls. *Baron.* A *plain* circlet having a cord of pearls wound around it diagonally (*tortil*) and displaying three windings. *Vidame.* A circlet surmounted by four crosses *patté.* *Viscount.* A circlet surmounted by four large pearls. (Fig. 5).

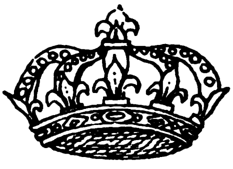


Fig. 4 — French royal crown.

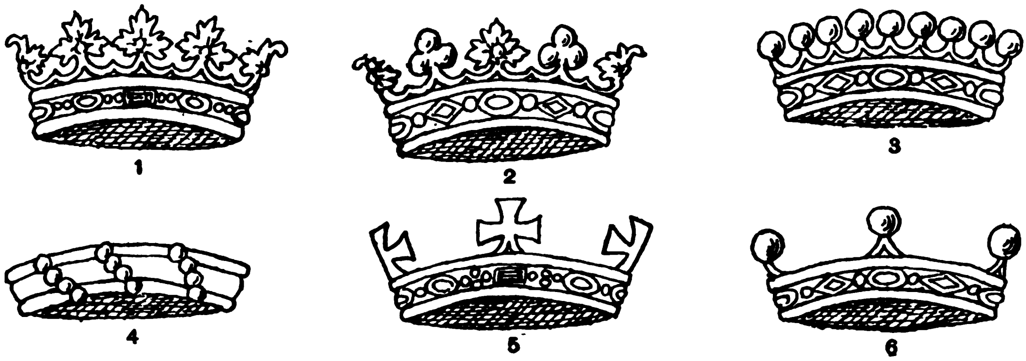
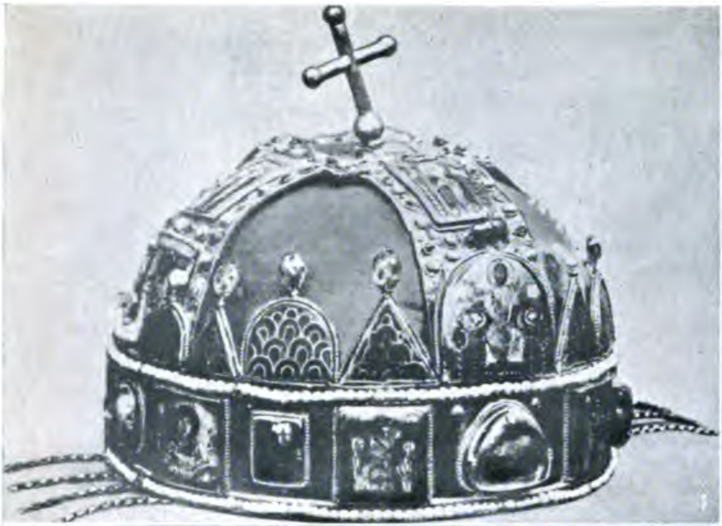
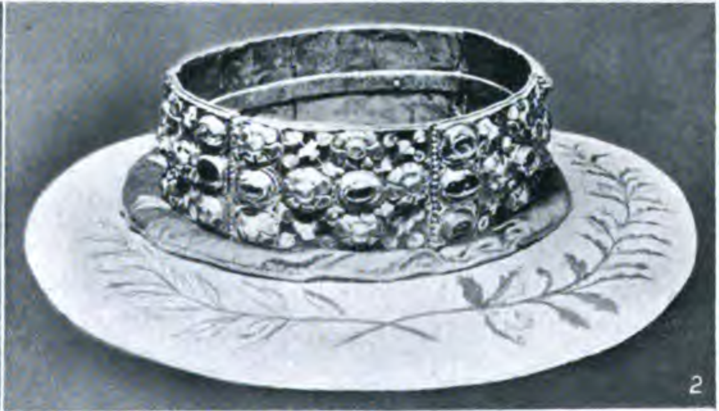


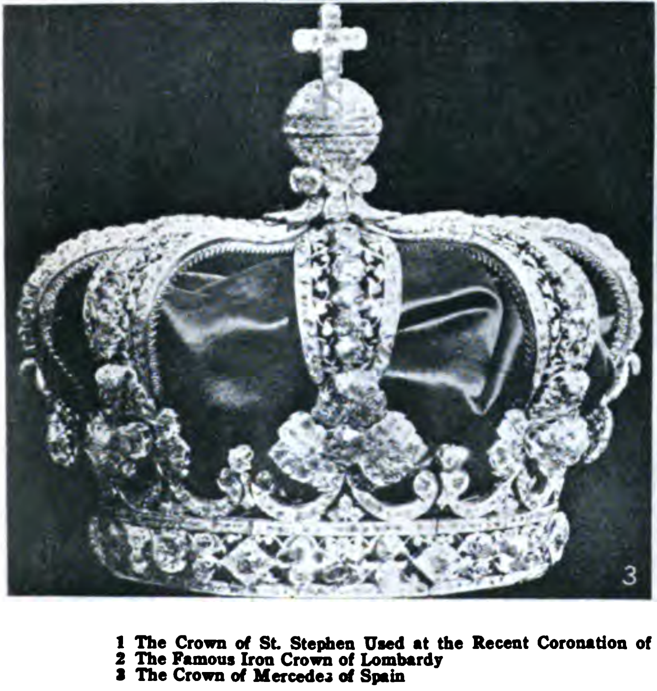
Fig. 5 — French crowns and coronets.

1. Ducal coronet. 2. Marquis' coronet. 3. Count's coronet. 4. Baron's coronet. 5. Vidame's coronet. 6. Viscount's coronet.

CROWNS







1 The Crown of St. Stephen Used at the Recent Coronation of King Charles of Hungary
2 The Famous Iron Crown of Lombardy
3 The Crown of Mercedes of Spain

German Crowns and Coronets.— *King.* The new German king's crown bears close similarity to the crowns of the crown prince and the archduke. But the crown prince of the Empire and of Prussia has a crown similar to the imperial crown (four arches surmounting a mound), the circlet of eight plates alternating four eagles and four crosses as decoration. (Fig. 6). The German king's (modern) crown has no lining (*Futter*), whereas the crown prince's and archduke's has. Electors without sovereign rights bear a coronet with ermine circlet and but one arch (*diadem*). The ducal coronet has a circlet of ermine and is lined to the top of the arches. The coronet of the prince (*Fürst*) not of royal blood shows two crossed arches on a circlet of ermine; often, however, a crown or gold circlet with leaves (like the *noble* coronet) took the place of the ermine, surmounted with an ermine tail. *Count.* The last-mentioned coronet, but without the ermine tail, was attribute of a count. The modern count's coronet displays nine pearls. The *baron's* coronet displays seven and that of the untitled noble, five. (Fig. 7).

The Crown in Heraldry.— Unless otherwise stated, the crown in heraldic blazon refers always to a ducal coronet (see Fig. 3). Animals, chiefly as *supporters,* often carry a coronet on their necks. In such cases they are blazoned as *gorged,* as *a hind gorged and chained.*

Votive Crowns.— Early Christian kings frequently dedicated their crowns to the Church. From this arose the cult of devoting imitation crowns to churches to be suspended by chains attached to their upper rim. Such gifts to the Church were known as *donaria* and the crowns are known as *votive crowns.* Later, these crowns were often used for illuminating purposes by suspending other chains from the lower rim to support a lamp. Many of these votive crowns of ancient date exist, but the most noted are the eight massive Gothic gold crowns discovered (1858) buried at Guarazar (Spain). They are beautiful products of the art of the Visigoths and were consecrated in some church in the second half of the 7th century, as an inscription on one of them proves. The largest of these crowns displays an inscription that it was the gift of the Gothic king Reccesvinthus, whose reign commenced in 649 and who died 672. (Fig. 8). The four-inch wide gold circlet is set with 30 Oriental sapphires of great beauty, separated by 30 large pearls. Suspended from the lower band by 24 small gold chains are large golden letters in cloisonné enamel and set with jewels. They are arranged to form the words: "Reccesvinthus Rex Offeret" (dedicated by Reccesvinthus, the king). A pendant of gold and pearls, from which is suspended a pear-shaped red sapphire, acts as drop-piece to each letter. Four elaborately wrought chains support the circlet, falling from a double gold floral piece containing 12 sapphire pendants. The whole structure is held up by a gold loop passed through finely worked rock-crystal ornament. Other votive crowns are extant, such as those of the princes Agilulph and Theodolind, from the Monza treasure, etc.

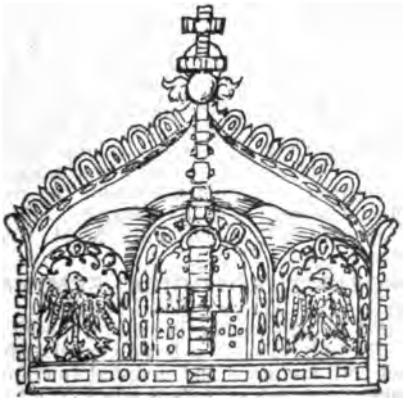


FIG. 6 — Present imperial German crown.

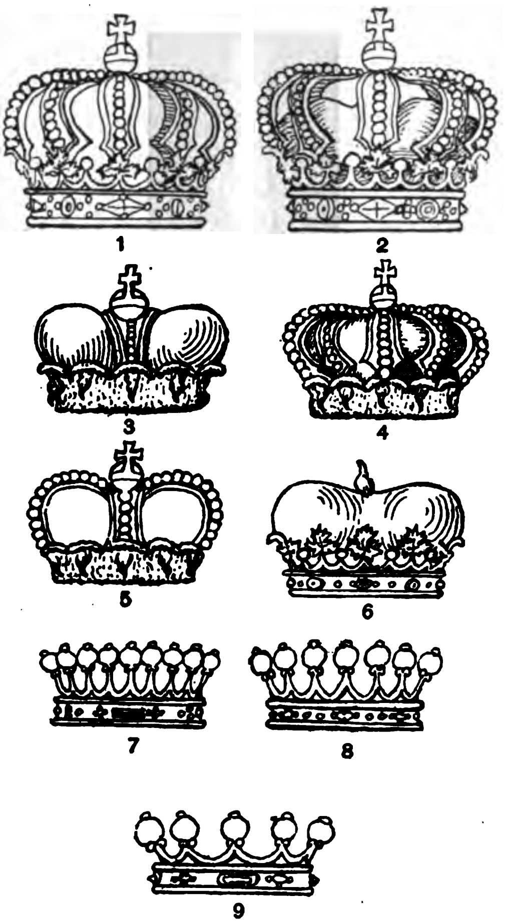


FIG. 7 — GERMAN CROWNS AND CORONETS.[1]

1. Modern king's crown. 2. Archduke's crown. 3. Elector's coronet. 4. Ducal coronet. 5. Coronet of a prince (*Fürst*) of nobility, not royalty. 6. Coronet of the *Erlaucht* (highness) degree of nobility. 7. Count's coronet. 8. Baron's coronet. 9. Coronet of the lower degree of *nobility* (Adelskrone).

Corona Lucis.— It was the cult of early Christian monarchs dedicating crowns to the Church and, later, the utilizing of these circlets as a point of suspension for lamps, that led to the *coronal* or *corona lucis* — the *crown-light.*

During the Middle Ages these crown-lights were suspended from the church roof or vault to hold tapers. Some of these were most elaborate and of great dimensions. Several are still extant. (See CHANDELIERS). Our illustration (Fig. 9), taken from an old manuscript, displays two votive crowns in a church, a *corona lucis* between them. See also CORONA.

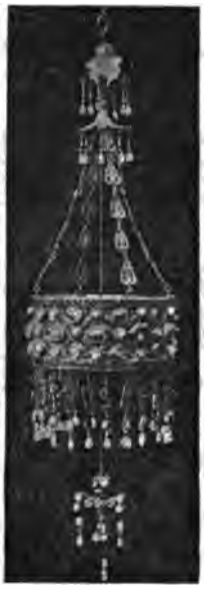


FIG. 8 — The gold crown of Reccesvinthus, Gothic king from 649 to 674.

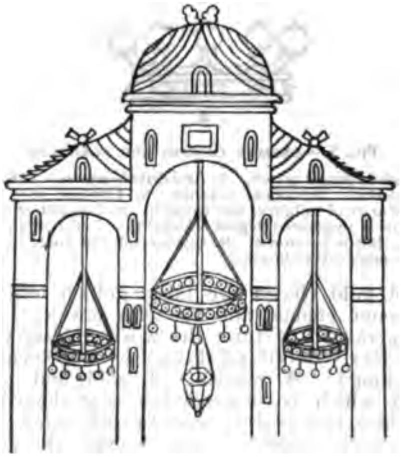


FIG. 9 — Coronae, from an ancient manuscript.

Bibliography.— Note on the Imperial Crown of King Edward VII (‘Connoisseur,’ Vol. VI, pp. 31–32, London 1903); ‘The Royal Crowns of England from the Norman Conquest to the Crown of King George V’ (*Windsor Magazine,* Vol. XXXIV, 1911, London); ‘The King's Coronation’ (London 1911, illustrated); Jones, Wm., ‘Crowns and Coronations: a History of Regalia’ (new ed., London 1902); ‘Die Kroninsignien des Koenigreiches Boehmen’ (compiled by Karl Chytel, A. Podlaha, K. Urba, Prague 1912); ‘Topographie der historischen und kunst Denkmaele im Koenigreiche’ (Boehmen, Vol. III).

CLEMENT WEBBER COUMBE.

CROWTHER, krō'thėr, **Samuel Adjai,** Anglican bishop: b. Ochugu, east of the kingdom of Dahomey, about 1809; d. Africa, 31 Dec. 1891. He was the first negro bishop of the Church of England. He was carried into slavery in 1821, but was freed, with a large company of his countrymen, by a British man-of-war in 1822; was placed in the mission school at Bathurst and was the first student enrolled in the Fourah Bay College where he subsequently became an instructor. He finished his education in England, where he took orders in the English Church in 1843, became a missionary at Akessa and accompanied the first and second Niger expeditions, publishing a narrative of the latter. In 1864 he was ordained bishop of the Niger and filled that place with honor. He published a dictionary and grammar of the Yoruba language (1852); a primer (1860), a grammar of Nupe, and a translation of part of the New Testament into the Yoruba. Consult ‘Good Out of Evil’ (London 1852), and ‘The Slave Boy Who Became Bishop of the Niger’ (1888), and a biography by Page (New York 1889).

CROYDON, England, municipal and parliamentary borough in county Surrey, 10 miles south of the heart of London, of which it is practically a suburb; near the sources of the Wandle and not far from the Banstead Downs; on the London and Brighton Railroad. It is a place of ancient origin, but its recent rapid increase is due to the overflow of London. The municipal borough includes South Norwood and Thornton Heath. It has important corn and cattle markets and boot and shoe manufactures. It returns one member to Parliament. Of special interest are the remains of the ancient palace, long a residence of the archbishops of Canterbury. Pop. 169,551.

CROZAT, krō'zä', a prominent French family of financiers and art collectors. PIERRE, b. 1661; d. 1740, was treasurer to the king and his various acquisitions included 19,000 original drawings, 2,000 engravings, 400 paintings, 1,382 intaglios and cameos and a library of 20,000 volumes. At his death, the collections passed to his nephews, Louis-François, Joseph-Antoine and Louis-Antoine, who added many beautiful things. The collection of pictures was finally acquired by Catherine II of Russia. Between 1729 and 1742 a finely illustrated catalogue of the collection was published under the title of ‘Cabinet Crozat.’ Consult Mariette, ‘Description sommaire des Collections de M. Crozat’ (1741).

CROZER THEOLOGICAL SEMINARY, Upland, Pa. (post office, Chester, Pa.). Founded in 1867 by the heirs of John P. Crozer. The school is on a large campus and endowed with buildings and invested funds to the amount of a million dollars. It has a faculty of 12 professors and instructors and a library of about 30,000 volumes. It is under Baptist auspices.

CROZET ISLANDS, a group of four, in the southern portion of the Indian Ocean, between Kerguelen and Prince Edward islands. They are all of volcanic origin and the most easterly of them, called East Island, has precipitous cliffs on the coast and in the interior lofty peaks, exceeding 4,000 feet. The largest, called Possession Island, visited by the *Challenger* expedition in 1873–74, is believed to be about 20 miles long by 10 broad. The total area is about 200 square miles. They have no permanent population, but are visited by sea-lion hunters and war vessels. They were both recently annexed to France. Consult Roth, ‘Crozet's Voyage to Tasmania’ (London 1891).

CROZIER, krō'zhėr, **John Beattie**, English philosophical writer: b. Galt, Ontario, 23 April 1849. He was educated at Toronto University, and in 1872 began the practice of medicine in London. He has written ‘Religion of the Future’ (1880); ‘Civilization and Progress’ (1885); ‘Lord Randolph Churchill, a Study in English Democracy’ (1887); ‘History of Intellectual Development’ (1887–1901); ‘My Inner Life’ (1898); ‘The Wheel of Wealth (1906); ‘Sociology Applied to Practical Politics’ (1911).

CROZIER, William, American military officer: b. Carrollton, Ohio, 19 Feb. 1855. He was graduated at the United States Military Academy in 1876; served for three years in the West, taking part in the campaigns against the Sioux and Bannock Indians; was instructor of mathematics at the Military Academy in 1879–84, when he entered the ordnance department; and was commissioned captain in 1890. He invented a wire-wrapped rifle, and with General Buffington, a disappearing gun carriage. He took part in the Spanish-American War; and was appointed chief of ordnance with the rank of brigadier-general in November 1901; and reappointed in 1905, 1909 and 1913, the detail being for four years. In 1912–13 he was detailed as president of the Army War College. He is the author of several of the series of ‘Notes on the Construction of Ordnance,’ which are the textbooks of the Department for the instruction and guidance of its officers. He is of international reputation in all matters connected with his department of military science.

CRUCIBLE, a vessel used in chemistry and the arts for containing substances that are to be subjected to high temperatures. A good crucible should be capable of withstanding great and sudden changes of temperature without fracture or disintegration; it should not be attacked by the substance it is to contain; and it should be infusible at the temperatures to which it is exposed. Numerous materials are used in the manufacture of crucibles, each having its own peculiar advantages and disadvantages. Platinum is an ideal material for many purposes, but it is exceedingly expensive and it cannot be used for the fusion of metals. Nickel is sometimes used instead on account of its cheapness. Clay, or a mixture of clay with sand, graphite, or old broken crucibles, is a favorite material, and Hessian crucibles, composed of equal parts of clay and sand, are in very general use. Hessian crucibles are commonly triangular in shape and coarse in texture. They are porous, they fracture easily from sudden changes in temperature, and they will not withstand the action of litharge; but they are cheap, and will not fuse at any temperature that is attained in ordinary operations. The clay that is used in the manufacture of crucibles should be “weathered” for some months, by exposure to air in a moist condition, in order to effect the decomposition or elimination of certain impurities, such as pyrites, that would be prejudicial to the finished vessel. Graphite is used to a considerable extent in the manufacture of crucibles, especially for those that are to be used for melting metals. Lime crucibles, cut from blocks of well-burned lime, are practically infusible, but they will not stand exposure to air for any length of time, since they absorb moisture, becoming converted into calcium hydrate, and then disintegrate. Magnesia crucibles are also practically infusible, and are not affected by exposure to the air. A mixture of equal parts of magnesia and bauxite (q.v.) makes excellent crucibles. Alumina (oxide of aluminum) is also highly recommended as a material for crucibles, as it will withstand sudden changes of temperature quite well, is practically infusible for all ordinary purposes, and is not attacked even by melted sodium. Carborundum is also used.

CRUCIFERÆ, kroo-sĭf'ẹ-rē. See BRASSICACEÆ.

CRUCIFIX. See CROSSES AND CRUCIFIXES.

CRUCIFIXION. The history of crucifixion as a mode of punishment for crime must be studied as a part of the Roman system of jurisprudence rather than of any Eastern system, Asiatic or Grecian. Greece and Asia had indeed from very early times occasionally resorted to it; but the practice did not become universal. The Hebrews, for example, adopted or accepted it only under Roman compulsion: under their own system, before Palestine became Roman territory, they inflicted the death penalty by stoning. At Rome, however, from the period of the Republic until the 4th century (when Constantine, in memory of the Passion of Jesus Christ, abolished this form of punishment) it was customarily inflicted upon slaves found guilty of denouncing their masters. Provincial brigands might also be crucified, but the crucifixion of a Roman citizen was never permitted by law.

In art, the cross upon which Christ was nailed has been usually represented as one formed with the vertical staff or post extending noticeably above the horizontal beam; and this harmonizes not only with the description in Matt. xxvii, 37 — that “they set up *over His head* His accusation written” — but also with the traditions transmitted to posterity by the earliest Christian Fathers. It seems to us that the choice of the T form by certain modern painters lacks justification. Certainly the oldest known works of Christian artists indicate the general acceptance of the so-called immisa or Latin form of that symbol which, from the time of the sacrificial death onward, the faithful regarded as an emblem of divine approval of Christian virtues; and there is no good reason for supposing that the continuity of interest in the symbol of the Passion was ever wholly broken. Artistic representation and reproduction of the sacred theme, however, appear to have been frowned upon until, in the 6th century, the carving of crucifixes began, and, in the 8th, the crucifixion was represented in mosaic. The latter was made for the oratory that Pope John VII built in the Vatican (A.D. 705), and it exemplifies the artistic treatment of its theme — especially by clothing the figure of Christ — noted throughout the first period, which extended from the 6th century to the 12th or 13th. It has been well said that in this early period "The Crucified is shown adhering to the cross, not hanging forward from it: He is alive and shows no signs of physical suffering; He is clad in a long, flowing, sleeveless tunic which reaches the knees. The head is erect, and surrounded by a nimbus, and bears a royal crown." We see Christ not suffering but triumphing gloriously on the cross. "Moreover Christian art for a long time objected to stripping Christ of His garments, and the traditional tunic remained till the 9th century or even later." But presently realism begins to transform Christian art; the tunic becomes a shorter garment, reaching from waist to knees; the head droops and is crowned with thorns; the arms are bent back; the body is contorted; the face is wrung with agony; blood flows from the wounds. Usually, but with conspicuous exceptions, realism prevailed during the second period (12th or 13th century onward), and often the living and triumphant Christ gives place to a Christ dead, in all the humiliation of His Passion. The older interpretation, with derivatives in the second period, may be exemplified as follows: Wholly serene, unmoved, superior to suffering are the 8th century representation in ivory in the Museum of Cividale and the fresco, also of the 8th century, in the church of Santa Maria Antiqua in Rome. Giorgione ('Christ with the Cross') and Rubens ('Descent from the Cross') dwell upon His beauty — the former upon the beauty of the face; the latter of the naked body. Tintoretto ('The Crucifixion,' church of San Cassiano, Venice) represents the Saviour as a robust man who evidently is able to endure anything unflinchingly, almost defiantly, thanks to physical courage.

CRUDEN, kroo'dĕn, **Alexander**, Scottish biblical scholar: b. Aberdeen, 31 May 1700; d. Islington, 1 Nov. 1770. He was educated at Aberdeen at Marischal College, with a view to the Church, but having exhibited decided symptoms of insanity, he was placed in confinement. On his release in 1722 he went to London, where he was employed as tutor in several families. Previous to 1732 he opened a bookseller's shop under the Royal Exchange, and in 1735 was appointed bookseller to Queen Caroline. His great work appeared in 1737, under the title of 'A Complete Concordance of the Holy Scriptures of the Old and New Testament.' In a pecuniary point of view it was not at first successful, and the embarrassments to which it reduced the author caused a return of a mental malady, which occasioned his being sent by his friends to a lunatic asylum. After his release he instituted an action of damages against those who had confined him, and published an account of his confinement under a whimsical title. He then acted as corrector for the press, and began to believe that he was divinely commissioned to correct the manners of the world. He styled himself 'Alexander the Corrector,' and went about exhorting the people to keep the Sabbath. He also petitioned the king for the honor of knighthood and Parliament to constitute him by act "the Corrector of the People." In 1753 he was again placed in confinement, and again, on being liberated, published an account of his case. Of Cruden's great work, the Concordance, three editions appeared during his life. The pains which he took with it were prodigious, constructing it anew from the foundation, without availing himself of the labors of his predecessors, and verifying personally the accuracy of each quotation and reference. The best edition is by Alexander Chalmers (London 1812; 10th ed., 1824, with a memoir). He was also the author of 'A Scripture Dictionary, or Guide to the Holy Scriptures'; and 'The History and Excellency of the Scriptures.'

CRUELTY, in law, any wilful and malicious conduct which may be dangerous to the health or life of another; a malicious act causing great pain. Within the past 100 years many statutes have been passed, both in Great Britain and the United States, to protect the helpless, particularly lunatics, children and domestic animals. The term is important in law also in connection with divorce. Parents who are guilty of cruelty to children may be punished by law or their children taken away from them and put in the care of others. While cruelty to domestic animals, except when it amounts to a nuisance, is not a criminal offense at common law, many statutes provide severe punishment for persons guilty of this crime. The earlier laws on the subject were enacted more for the protection of the animals as chattels than for humane principles, but through the influence of philanthropic societies this was remedied not only in the United States but also in Great Britain and other parts of Europe as well. The punishment in the United States is usually by fine or imprisonment. By a statute passed in England in 1900, the same protection is given to wild animals in captivity as to domestic animals. See Divorce.

CRUICKSHANK, krŭk'shănk, **Ernest Alexander**, Canadian historical and military writer: b. Welland County, Ontario, 1854. He was educated at Upper Canada College, early acquiring an extensive acquaintance with several modern languages. For a few years he was engaged in newspaper work in the United States, but he returned to Fort Erie, Ontario, became warden of Welland County in 1886, police magistrate at Niagara Falls, Ontario, 1893, and was in 1908 military archivist at Ottawa. In 1899–1904 he was lieutenant-colonel commanding the 44th regiment of militia, and afterward was appointed a district commanding officer. In 1907 he was elected a Fellow of the Royal Society of Canada. His principal publications are 'Battle of Lundy's Lane' (1889; 3d ed., 1894); 'Battle of Queenston Heights' (1891); 'Battlefields of the Niagara Peninsula' (1891); 'A Century of Municipal History' (1892–93); 'Battle of Fort George' (1896); 'Documentary History of the Campaigns on the Niagara Frontier in 1812–14' (9 vols., 1896–1910).

CRUIKSHANK, George, English illustrator and caricaturist: b. London, 27 Sept. 1792; d. there, 1 Feb. 1878. Family necessities compelled him when still a child to produce what he could, and the want of careful preliminary study at his outset in art affected his productions through a great part of his career. Hence his defects were chiefly those of taste and these have operated to his being popularly ranked somewhat lower as an artist than his merits deserve. For his drawing was always faithful, precise and felicitous, his facility amazing and his invention inexhaustible. The catalogue of his productions prepared by the keeper of the prints in the British Museum comprises 5,500 articles, many of them recalling Rembrandt's work by their richness in light and shade. The earliest of his drawings known is dated 1799, when he was only seven years of age, and when 15 he was comparatively distinguished. His first occupation was designing illustrations for children's books and popular songs. He contributed also to *The Scourge* and *The Meteor* and at about the same time sketches referring to the trial of Queen Caroline. In 1837 Cruikshank commenced in 'Bentley's Miscellany' his famous series of etchings on steel illustrative of Dickens' 'Oliver Twist,' full of pathos, humor and tragic power; the illustrations for the 'Waverly Novels,' and 15 plates for 'Don Quixote.' Having connected himself with the temperance movement he produced the 'Bottle,' a powerful series of designs, characterized, from its subject and the artist's object, by inevitable vulgarity, but pregnant with genius and high moral teaching. In 1830 he tried to paint and while he could not handle his tools well, he nevertheless displayed here as elsewhere his keen sense of caricature. Of these efforts the best are two: 'Cinderella' in the South Kensington Museum and 'The Worship of Bacchus' (National Gallery). In spite of his genius, industry and homely mode of life he never succeeded in acquiring a competency and was compelled in extreme old age to depend on the aid of his admirers. His true life-work consisted in illustrating the costume, manners and vices of the people for a period of considerably more than half a century. Consult Stephens, 'A Memoir of Cruikshank' (London 1891); Bates, 'George Cruikshank' (1878); Jerrold, 'Life of George Cruikshank' (1897); 'Cruikshank's Water Colors' (1903); Cohn, 'Bibliographical Catalogue of the Printed Works Illustrated by George Cruikshank' (New York 1914) and a biography by W. H. Chesson (1912).

CRUISER, an armed vessel the prime function of which is to gather information and to prevent the enemy from doing likewise, though it may incidentally protect the commerce of its own country or inflict damage on that of another. These vessels are generally built for fast sailing and are well manned. The cruiser rates technically just below the battleship and above the destroyer and gunboat. The battle cruiser carries guns of the largest size, but fewer of them and less armor than the battleship. The weight thus dispensed with enables it to be faster than the battleship. It can thus both gain information of the enemy before the battle and take part in the battle. The armored and protected cruisers, though still useful, are obsolescent stages in the development of the battle cruiser. An armored cruiser has side or vertical armor and horizontal or deck armor. A protected cruiser has horizontal or deck armor only. A scout cruiser is of moderate size, with almost no armor, lightly armed, but of tremendous speed. They are used for reconnaissance. Sometimes in war, merchant steamships of great speed are armed to assist a navy and such vessels are then called auxiliary cruisers. In the Spanish American War cruisers of this class performed services of great importance to the United States Navy. Similar boats, known as commerce-destroyers, have been used by the Germans in the European War. See UNITED STATES NAVY, THE; WARSHIP.

CRUMMELL, Alexander, American colored Episcopal clergyman: b. New York, 3 March 1819; d. Point Pleasant, N. J., 9 Sept. 1898. His father was a native African and his mother a free woman. He received his education at the Oneida Institute and in 1839 applied for admission to the General Theological Seminary. His request was refused owing to the intense prejudice against the higher education of the negroes. He accordingly went to England in 1849 and graduated at Cambridge University in 1853. He engaged in missionary work in Liberia 1853–73, when he went to Washington, D. C., and founded Saint Luke's Church, of which he was rector until 1895. In 1897 he organized the American Negro Academy in New York. He published 'The English Language in Liberia' (1861); 'The Future of Africa' (2d ed., 1862); 'The Negro Race Not Under a Curse' (1863); 'The Greatness of Christ, and Other Sermons' (1882); 'Africa and America' (1891).

CRUSADE, Children's. See CRUSADES.

CRUSADES (Portug. cruzado, «marked with the cross»), the military expeditions which were sent out by the Christian peoples of the West from the end of the 11th till the latter half of the 13th century for the conquest of Palestine. From the earliest times pilgrims had gone to what, because of Christ's life therein, was called the Holy Land. In 637 Palestine fell into the hands of the Mohammedans, but, though several churches were turned into mosques, Christians were allowed full liberty to come and go to the holy places in Jerusalem for nearly four centuries. In 969 the Fatimite dynasty extended its rule over Egypt and Palestine and with this change of rulers there came an end of the cordial relations. The insults, and even injuries, that Christian pilgrims suffered aroused bitter feeling in the West. Finally Pope Silvester II (999–1003), one of the best known of the mediæval popes and famous for his very practical character, issued a call for volunteers for the purpose of freeing the Holy Land. His summons met with no success. In 1073 Palestine came under the control of the Seljukian Turks and the conditions there became even worse than before for the Christians. Pope Gregory VII (Hildebrand), in 1074, asked the Western nations for help for their suffering brethren in the East and even suggested to the German emperor, Henry IV, that it would be easy to raise an army of 50,000 for the rescue of the Holy Land from the hands of unbelievers. The idea of the crusades that had thus been incubating in Western minds for nearly a century did not come to fruition until 1095, when the awful state of affairs that Christian pilgrims had to encounter in the Holy Land became unbearable. Peter of Amiens, surnamed the Hermit, saw the terrible situation while on a pilgrimage to the Holy Sepulchre and succeeded in arousing the interest of Pope Urban II and obtained permission to preach a crusade.

The first great cause of the crusades, then, was the earnest desire to free the Holy Land. It seemed to the mediæval Christians to be a question of the maintenance of their religious honor that the infidel should not be allowed to occupy the holy places. Other causes conspired for their occurrence just at this period. It was felt by Western rulers, and especially by the popes, that unless the Turks were repressed in the East, they would gradually acquire irresistible power and eventually invade the West, with hope of success. For the lower classes in the West, on the other hand, life had become almost intolerable because of the oppression of the nobles, the frequent wars and the almost servile duties that feudalism enjoined. As an addition to other causes of dissatisfaction, the harvest had practically failed in the West for several years and the year 1095 proved to be a particularly bad year for farmers and many of those dependent on the land and its products suffered severely from famine. These material difficulties predisposed the people to risk all in the hope of betterment. There was little chance to rise in the West and the vague opportunities of distant war seemed to promise much. Besides, the spirit of chivalry had come in and many of the nobles devoted themselves to the cause with the idea that they would thus win favor of the heavenly queen, the mother of the Lord, whose life had been lived in Palestine and whom they had chosen for their patroness. Devotion to the Blessed Virgin also caused women to urge their husbands, brothers and other male relatives to join in the holy war for the Christian possession of her home. It needed only the intimation of authority to precipitate an Eastern expedition and that came very naturally from the popes as the acknowledged spiritual heads of Christendom. Pope Urban II, having heard Peter of Amiens' story of Christian suffering in the Holy Land, summoned a council to meet at Piacenza and gave Peter the opportunity to address the multitude, which assembled in such numbers that he had to talk in the open air. In the following November 1095, ambassadors from all the nations were present at a council at Clermont, where Peter's words had so much power that with one voice the multitude called out «God wishes it,» and this became the slogan of the crusade.

First Crusade.— In 1096, a number of armed bodies set out in different divisions. Many of these hosts were unamenable to military discipline, and, being unprovided with even the necessaries for such an expedition, were practically completely destroyed in the different countries through which they had to pass before reaching Constantinople, which had been chosen for their place of meeting. Only a few stragglers found their way home again or succeeded in maintaining themselves for a time until the arrival of the more regularly organized bodies of troops which set out the next year. With this body were most of the distinguished men whose names are associated with this first great chivalric effort to redeem the Holy Land from the infidel. At the head of nearly 100,000 men were Godfrey of Bouillon, duke of Lower Lorraine; Hugh of Vermandois, brother to Philip, king of France; Baldwin, brother of Godfrey; Robert II of Flanders; Robert II of Normandy, brother of William II, king of England; Raymond of Toulouse; Bohemond of Tarentum, son of Robert Guiscard; Tancred of Apulia, cousin of Bohemond; and other heroes. Tancred is the hero of whom so many poets have sung. He was what Chaucer called «the type of the very gentle perfect knight.» It is this first crusade that has formed the subject of Tasso's 'Jerusalem Delivered,' and the poem owed not little of its interest to the fact that it was written while the victory at Lepanto was fresh in the mind of the poet and still well remembered by his readers, for, while the crusades are considered to end with the last quarter of the 13th century, the gathering of the naval force that overcame the Turks under Don John of Austria was really the result of the crusading spirit.

The various armies of the First Crusade gathered at Constantinople about Christmas 1096. Here they were delayed for some time by the diplomacy of the Greek emperor, who wished to be assured that the immense forces which had come partly as the result of his own request for aid would not prove the ruin of his tottering empire. About Pentecost, 1097, the Crusaders crossed over to Asia by the Strait of Gallipoli, and their first conquest was the town of Nicea in June 1097. Shortly after this, on 4 July, the Crusaders met an Eastern army in pitched battle for the first time, at Dorylæum, and routed and put it to flight. The crusading army now marched through Asia Minor until they reached Antioch. They would probably have been long delayed in the siege of this town but for treachery which threw it into their hands in June 1098. The citadel, however, remained in possession of the Turkish garrison. Before they captured it, they themselves had to stand siege in Antioch from a Turkish army which surrounded the town soon after its capture. After three weeks of siege the Crusaders were reduced to a very pitiable condition, but on 28 June they made a vigorous sortie and succeeded, in spite of their famished and exhausted condition, in completely routing the Turkish besiegers. The Crusaders remained nearly a year in the neighborhood of Antioch and only in May 1099 was the march against Jerusalem begun. The siege of the city was commenced early in June. Finally, after six weeks of a fierce siege, the city was captured by a two days' storming, on 15 July. Godfrey of Bouillon was chosen king of Jerusalem, but humbly refused to wear the king's crown on the spot where the Saviour of the world had worn a crown of thorns. He accepted as his designation instead of king that of Defender of the Holy Sepulchre. After scarcely a year of sovereignty, however, he died in 1100 and was succeeded by his brother Baldwin. Baldwin had separated from the main army of the Crusaders while it was in camp in the neighborhood of Antioch and had proceeded to Edessa. This city was in possession of a Christian prince, who was able to maintain himself only with difficulty against the Mohammedans. Baldwin concluded a treaty by which he agreed to aid this prince against the Mohammedans on condition that he himself should be his successor on his death. This treaty was made in February 1098, and, as the Prince of Edessa was killed soon after in a popular insurrection, Baldwin asserted effectually his claims to succeed him and soon made himself ruler of an extensive territory stretching even beyond the Armenian Mountains and the plain of Mesopotamia. He was accordingly his brother's natural successor as the ruler in Palestine.

Second Crusade.— In 1144 the Saracens recaptured Edessa. This produced great consternation throughout Europe, because it was feared that the other acquisitions made by the Christians during the First Crusade would also fall once more into the hands of the infidels. As a result, Pope Eugenius III called upon Saint Bernard of Clairvaux to preach the Second Crusade. The two leaders of the expedition were the German emperor, Conrad III, and the king of France, Louis VII. They collected about 140,000 men and in 1147 led them to the East. Notwithstanding the enthusiasm with which this crusade had been entered upon, for it is recorded that after Bernard's sermon, it happened more than once, that enough crosses not having been provided for all those who wished to assume the cross, that is, to promise to go on the crusade, Bernard had to cut up his garments in order to supply them, the army failed of its purpose of recapturing Edessa, and indeed only served by its presence still further to weaken the already almost tottering kingdom of Jerusalem. The crusading armies returned to Europe in 1149 and it was nearly 50 years before any other attempt was made to diminish the domination of the Saracens.

Third Crusade.— In 1187, Saladin took Jerusalem from the Christians and the zeal of the West blazed out once more. The three principal monarchs of Europe, Frederick Barbarossa, emperor of Germany, Philip Augustus, king of France, and Richard Cœur de Lion, of England, offered to lead their armies in person against the Saracens. Frederick's army succeeded in reaching the Holy Land only after having overcome an immense Turkish army at Philomelium, 7 May 1190. Not long after his victory Barbarossa was drowned in the river Kalykadnos and this took all the spirit out of his troops. His son Frederick led the army to the siege of Acre, but after his death, in January 1191, the German army abandoned the expedition. Philip and Richard agreed to unite their forces at Messina, in Sicily. Here they stayed until the spring of 1191. Philip reached the Holy Land on the day before Easter and joined the other Crusaders before Acre. Richard's fleet was dispersed by a violent storm and his wife and mother were detained as prisoners on the island of Cyprus, to which their vessel had been driven, by Isaac Comnenus, the heartless, despotic ruler of the island. On Richard's arrival from Rhodes, where his vessel had been compelled to put in, he succeeded in taking Isaac and his daughter prisoners and had himself proclaimed king of Cyprus. 'Twas not until the beginning of June that he joined the French at Acre. Owing to jealousies between the two monarchs, the French king abandoned the expedition shortly after the fall of Acre. Richard succeeded in many wonderful exploits against the Saracens, but was not able to accomplish much in regaining territory. He did not succeed in recapturing Jerusalem, and, though he defeated Saladin at Azoof and captured Jaffa, he at last despaired of the capture of Jerusalem and made a truce with Saladin by which the sea-coast from Tyre to Jaffa remained in the possession of the Crusaders, and Christians were allowed full liberty to visit the Holy Sepulchre.

The Fourth Crusade was due to the zeal of Pope Innocent III. Its chief promoters were Godfrey of Champagne, Baldwin, Count of Flanders, and Dandolo, the old Doge of Venice. The Marquis of Monteferrat was chosen leader of the expedition. The Crusaders assembled at Venice and were induced by Dandolo to attack Zara in Dalmatia, a town which had formerly belonged to the Venetians but which had renounced its allegiance. This was contrary to the wish of the Pope, who excommunicated the Crusaders for their failure to fulfil their vow of proceeding to the Holy Land. News now came to the Crusaders' camp that there was a revolution in Constantinople and their aid was asked for one of the claimants to the throne. Dandolo seems to have been mainly responsible for encouraging the Crusaders to accept the invitation to proceed to Constantinople, and as a result the crusade was entirely diverted from its original purpose. In 1203, Constantinople was taken by the Crusaders, who established therein a Latin empire.

Children's Crusade.—The failure of so many expeditions to the Holy Land proved very discouraging and people began to wonder if there was not some cardinal fault in the make-up of the parties that went on the Crusade. It began to be said that the Holy Land would never be captured, except by those who were innocent. Accordingly, when Stephen, a French peasant boy, in June 1212, began to preach a children's crusade, he made many converts to his opinion that possibly children might accomplish what adults had failed in. Some 30,000 French children are said to have taken part in the expedition. A like movement began in Germany and soon proved to have almost as great a following. Over 20,000 German children crossed the Alps into Italy. Both expeditions, as might have been expected, came to grief. The French children were tempted on board vessels by designing slave merchants in Marseilles, and many of them were sold into slavery. Many of the German children lost their lives through the hardships they had to endure on the march. Some were lost at sea and some settled down here and there throughout Italy.

These expeditions represent a phase of that tendency to psychic contagion that sometimes comes over even intelligent people in an inexplicable way, and it is from this standpoint that they have been very much discussed in recent years. The Children's Crusade corresponds to the witch baiting of more modern times, or to some of the many spiritual manifestations of older periods. Some doubts have been thrown on phases of the history of the Children's Crusade, as for instance the fate of the French children, but there seems good reason to believe the account given here to be correct. Consult Winkelmann, 'Geschichte Kaiser Friedrichs II' and Röhricht's article in 'Sybels Histor. Zeitschrift,' (1876). In English there is the popular account by Gray, 'The Children's Crusade' (New York 1871), and in French, 'Des Essards La croisade des enfants' (Paris 1875).

Fifth Crusade.— After an interlude of five years, after the Children's Crusade, a Hungarian expedition went to Egypt and captured Damietta. There was so much disaffection among the Crusaders themselves, however, that the expedition had to be abandoned. This is sometimes spoken of as the Fifth Crusade. What is more usually called the Fifth Crusade was led by Frederick II of Germany and owed its inception to Pope Honorius II and to Pope Gregory IX. A pestilence broke out in the army just as it was ready to sail and this delayed the expedition. Frederick seems to have lost heart after this and retired to Pozzuoli, near Naples, thus incurring the displeasure of Pope Gregory IX, who put him under a ban of excommunication. The next year, nevertheless, Frederick went to the Holy Land and without giving battle succeeded by negotiation with the Sultan in securing for himself the kingdom of Judea, only on condition, however, of tolerating in this kingdom the Mohammedan religion. He was crowned king and concluded a truce with the Sultan for 10 years; but this was soon broken.

The Sixth and Seventh crusades were led by Saint Louis IX of France. He considered that the centre of the Moslem dominion was in Egypt and he resolved to strike his blow there. He laid siege to Damietta and captured the city in June 1249. In his march up the Nile, however, his army became involved in the mazes of swamp and streams of the river and was defeated. Forced to retreat, it was overtaken by the army of the Sultan, where resistance was hopeless, and the king and his whole army had to surrender. Louis's ransom was the city of Damietta. After waiting for a time for reinforcements, he returned home. Twenty years later the saintly king undertook the Seventh Crusade. He landed his army in 1270 on the northern coast of Africa and after a large number of his knights had perished, he himself died before Tunis. Peace was concluded and the French Crusaders returned home. About the same time an English army under Prince Edward, afterward Edward I, proceeded to Syria. Finding that little could be accomplished, they concluded a truce for 10 years and then returned to England. For about 20 years after this, the remnants of the Latin kingdom in Palestine succeeded in maintaining themselves independent. Acre was captured by the Sultan of Egypt in 1291, just 100 years after it had been originally taken by Richard Cœur de Lion, and this obliterated the last remnant of the kingdom that had been founded by the Crusaders.

The results and significance of the crusades for western Europe, and indeed, for the civilized world of all after times, are out of all proportion to the little that was accomplished in Palestine. The result of the intercommunication of nations caused by a series of joint enterprises could scarcely fail to bring with it broadening of views and the intellectual development consequent upon friction of minds trained so differently. In merely material progress, the most noteworthy effect was upon commerce. The use of many Eastern luxuries was introduced into Europe, and as a result the cities of Italy especially acquired commercial importance. The commercial spirit thus aroused and the impetus of the later crusades gave rise to the Hanseatic League, which marks the first great step in modern commercial progress. In every branch of art and knowledge the effect of the crusades soon became evident. There has been in recent times a renewed interest in the 13th century. There are some who do not hesitate to say that the 13th is one of the greatest of centuries because of what it represents of accomplishment in the arts and of development of the human mind as well as the rise of human liberty. Nearly all of the movements that led up to such accomplishment can be traced to the crusades. In the East, the Europeans had come in contact with Arabian philosophy and Arabian mathematics, and the consequence was an interest in these subjects that spread very widely and that eventually gave rise to the university and even to the development of such advanced physical science as was taught by Albertus Magnus and Roger Bacon. The interest of the Crusaders in Byzantine architecture and arts led to the development of a taste that soon created a demand that must be satisfied. Gothic architecture has been traced to Eastern influences. The other great arts of the 13th century, statuary, stained glass working, book illumination, metal working in its various forms and needlework, all owe their inspiration to Eastern sources. That they were developed quite beyond the models that had been sent by Europeans is due to the fact that the generations following the crusades had traditions of accomplishment that led them to raise their genius to the highest possible point of accomplishment. Great political benefits in the crusades must not be overlooked. Many of the nobility lost their lives and many more lost their fortunes and their power, and as a consequence government became more centralized and national. This was especially true in France, and as a consequence peace was easier to maintain. The honors conferred on many of the Crusaders gave them opportunities to rise such as they would not otherwise have had. The distribution of wealth brought about by the heavy expenses that were incurred gave opportunities for many of the poorer classes to enter into industrial and commercial occupations. The very independence of mind that had been acquired by the distant expeditions created a spirit of enterprise and made men much more ready to try far-off adventures and even commercial speculations, than was the case before. Undoubtedly to the crusaders is owed more of what is distinctive in modern Europe than to any other connected series of human events.

Bibliography.— The literature of the crusades is very extensive, and only a few of the principal titles can be given. The most important collection of sources is the 'Recueil des historiens des croisades,' of which 15 volumes have been published (Paris 1841 et seq.). Consult also Bongars, 'Gesta Dei per Francos' (Hanover 1611); Villehardouin and De Joinville, 'Chronicles of the Crusades' (1908); Bréhier, 'L'Eglise et l'Orient au Moyen Age' (Paris 1907).

James J. Walsh,

Author of 'The Thirteenth, the Greatest of Centuries,' etc.

CRUSHING AND GRINDING MACHINERY. This article describes the class of crushers and grinders used to break up and reduce rock, stone, ore pigments, etc., to fragments or to powder.

Crushing machines are used for purposes of coarse reduction. They consist of various forms of «stamps» or stamp-mills, crushing rolls, gyratory crushers, etc., and are employed to reduce metal ores for subsequent treatment by the processes of amalgamation and concentration; for stone-breaking as for road-metal, and for crushing coal and coke.

For preliminary crushing, that is, for preparing material for finer crushing by various forms of stamps, rolls and rotary mills such as those described in detail under the title MINING AND MILLING MACHINERY, the types of machines usually employed are the jaw crushers and the gyratory crushers. Of the former, the «Blake,» the «Dodge,» and the «Buchanan» crushers are among the most familiar and extensively used types.

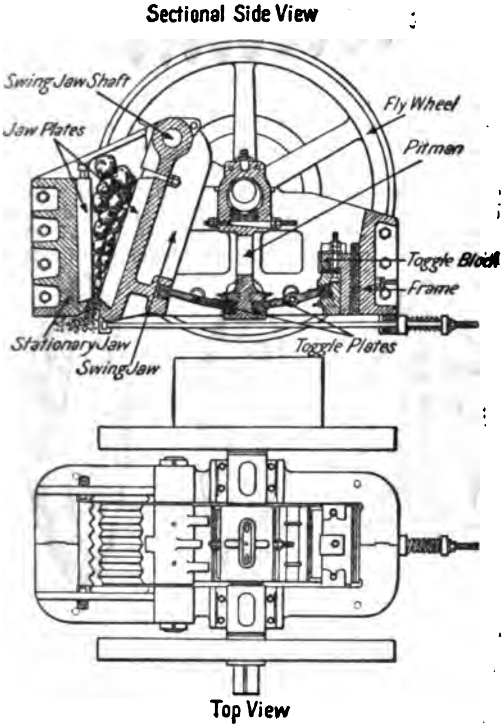


FIG. 1.

Fig. 1 illustrates a vertical section and a top view of a «Buchanan» stone crusher. It consists of a cast steel frame carrying two steel jaws, one fixed and one movable, which are arranged to form a V-shaped opening. The movable or swing jaw is hinged at the top and is connected with suitable mechanism by which it is alternately pushed forward and backward, to and from the fixed jaw, thus alternately reducing and enlarging the V-shaped opening. The material to be crushed is introduced at the top of the opening, and is reduced by the reciprocating motion of the swing jaw to a size fine enough to allow it to pass through the smaller outlet at the bottom of the opening. The adjustment to crush fine or coarse is made by means of removable steel liners placed between the planed surfaces of the frame and the main toggle block. The stroke is adjusted by means of jaw liners of steel placed between the top of the main toggle bearing and the bottom of the steel lugs cast on the frame so that the angle of the toggle can be increased for lengthening the stroke, or it may be flattened to diminish the same. For increasing the stroke one or more liners are added, and by this means a variation of about 50 per cent is obtained in the throw of the jaw. The receiving openings of these crushers range in size from 1½ x 3 inches to 24 x 30 inches; their weight ranges from 160 to 60,000 pounds; they require from 4 to 65 horse power to operate them at 250 revolutions per minute, and are capable of reducing the rock supplied to them into fragments ranging from 1 to 3 inches in size at a rate ranging from 4 to 35 tons per hour, according to the size of the machines. The capacity of a rock breaker depends on the distance between the jaws, and the number of revolutions of the power wheel. The amount of product is also affected by the kind of rock, the hard, brittle variety will go through faster than the sandstones and other tough rock. The accompanying table of «Relative Hardness of Elements and Ores» will serve to give a general idea of the relative powers required to crush them. It is important to note, however, that the power required will depend very much on the relative proportions of the mineral to the gangue matter; for example, galena may occur in a quartz gangue, and if the proportion of galena is very large, the hardness of the ore will be near the scale for galena as shown in the table; but, if the proportion is very small, the hardness of the ore will be near the scale for quartz.

RELATIVE HARDNESS OF ELEMENTS AND ORES

Element or Ore	Character	Hardness
Diamond	Brittle	10
Iron	Malleable	4 to 5
Platinum	Malleable	4 to 4.5
Arsenic	Brittle	3.5
Antimony	Brittle	3 to 3.5
Gold	Malleable	2.5 to 3
Silver	Malleable	2.5 to 3
Copper	Malleable	2.5 to 3
Bismuth	Brittle	2 to 2.5
Sulphur	Brittle	1.5 to 2
Lead	Brittle	1.5
Graphite	Inelastic	1 to 2
Corundum	Brittle to tough	9
Beryl	Brittle	7.5 to 8
Wolfram	Brittle	7.2 to 7.5
Quartz	Brittle to tough	7
Garnet	Friable to tough	6.5 to 7.5
Iron Pyrite	Brittle	6 to 6.5
Magnetic Iron Ore	Brittle	5.5 to 6.5
Copper Pyrites	Brittle	3.5 to 4
Mispickel	Brittle	5.5 to 6
Hornblende	Brittle	5 to 6
Fluor Spar	Brittle	4
Magnetic Pyrite	Brittle	3.5 to 4
Dolomite	Brittle	3.5 to 4
Spathic Iron	Brittle	3.5 to 4
Malachite	Brittle	3.5 to 4
Mica	Laminated	2.2 to 5
Gray Copper	Rather Brittle	3 to 4
Cerrusite	Very Brittle	3 to 3.5
Heavy Spar	Brittle	2 to 2.5
Copper Glance	Brittle	2.5 to 3.5
Galena	Brittle	2.5 to 3
Ruby Silver Ore	Brittle	2.5 to 2.75
Silver Glance	Malleable	2.5
Sylvanite	Brittle	1.5 to 2
Talc	Inelastic	1 to 1.5

Compounds of the heavy metals, such as gold, silver, copper, lead, etc., are soft, their hardness rarely exceeding 2.5 to 3; while that of the compounds of the arsenides and oxides of iron, nickel and cobalt are relatively hard, ranging from 6 to 6.5. Most of the sulphides, carbonates, sulphates and phosphates are soft. The conspicuously hard minerals are found chiefly among the oxides and silicates. The weights of the various ores differ within very wide limits. A spongy dry quartz containing very little metallic sulphurets is naturally much lighter than a wet dense quartz heavily charged with galena. Broken quartz sent to the mill generally ranges from 15 to 22 cubic feet per ton, and a convenient size of truck for handling the same is one having a capacity of about half a ton.

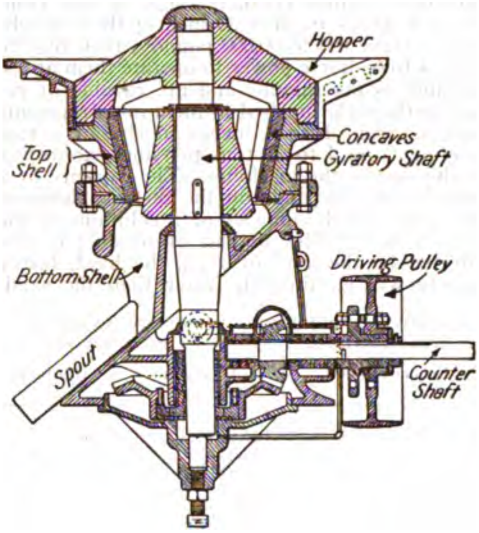


FIG. 2.

Gyratory Crushers.— In these machines, the crushing elements consist of an inverted hollow frustrum of a cone within which an upright frustrum of a solid cone is given a gyratory motion by a vertical shaft connected with a counter shaft operated by a suitable propelling mechanism. The vertical shaft is hinged at the top, and the material dumped into the hopper is crushed in the annular space between the walls of the two cones until it is fine enough to pass down and out of the openings at the bottom. The McCully and the Austin gyratory crushers are among the best representatives of this class of machines. Fig. 2 illustrates a vertical cross section of the Austin crusher. These machines are adapted to produce a much finer grade of crushed material than those of the jaw crusher type.

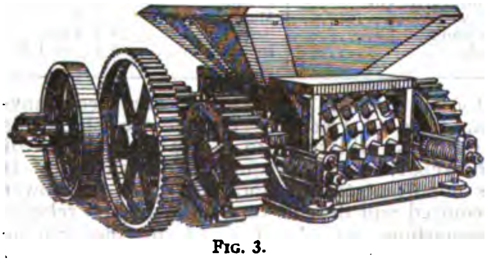


FIG. 3.

Crushing rolls are made in a great variety of forms, and are used for the production of a much finer grade of crushed material than that obtained by the use of the machines already described. In some of them the rolls are equipped with removable steel teeth. Such machines are used by the smelters for the coarse crushing of slag shells from slag cars and pots. Other forms have corrugated rolls, while the coal crushers and the coke crushers and sizers have rolls equipped with teeth of special design adapted for the crushing and sizing of the product according to the sizes demanded by the industrial and commercial trades. Coal crushers are described in detail under the title COAL MINING MACHINERY, while Fig. 3 illustrates a «Jeffrey» coke crusher and sizer. It is equipped with a feed hopper the form of which may be arranged to suit any required condition, and the rolls are made in segments with removable teeth, as shown by Fig. 4, or of interchangeable tooth rings, as shown in Fig. 5.

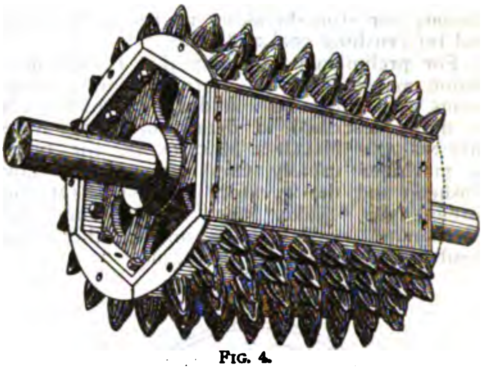


FIG. 4.

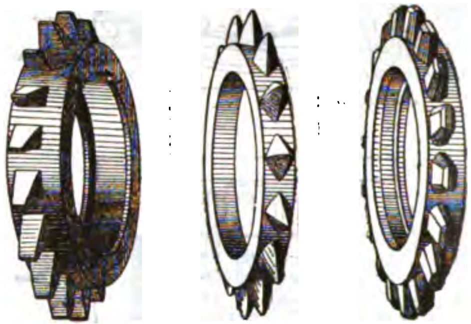


FIG. 5.

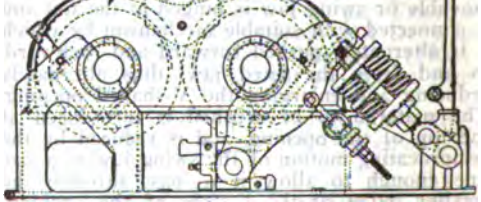


FIG. 6.

An external view of a set of plain crushing rolls is given in the article under the title MINING AND MILLING MACHINERY, together with a general description of the same, but Fig. 6, showing a sectional view of a «Humphreys» crushing rolls, is introduced here to convey a more detailed idea of the internal arrangement of the principal parts of these machines. Various forms of roll crushers are also used for crushing sugar-cane and other fibrous materials.

Other forms of crushers in common use are the «coffee mills,» which, while resembling the gyratory crushers, yet differ from them in that the vertical shaft has only a simple rotary motion without gyration; the «edge runner» crushers consisting of a vertical axle which carries a number of radial arms with heavy metal wheels attached to their outer ends. The rotation of the vertical axle causes these wheels to travel in a circular track on the bottom of a metal trough containing the material to be crushed; and sausage mills consisting of a longitudinal shaft carrying radial teeth which intermesh with similar teeth projecting from the inside of the cylindrical containing shell.

Grinding and pulverizing machines are used in many processes to reduce the products of the crushers. They are commonly known as mills, and are necessarily of a different character and of lighter construction than the crushing machines.

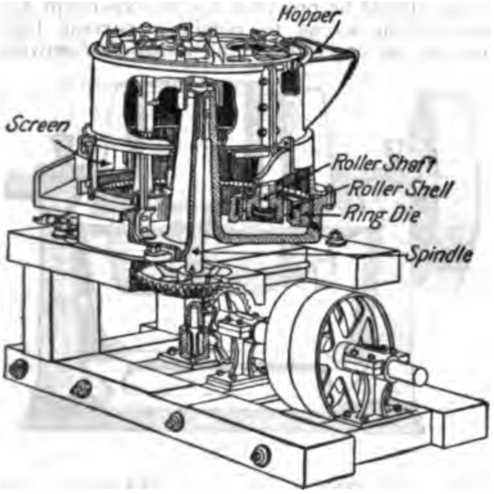


FIG. 7.

In the simple mill-stone mill, two stones set vertically one above the other, one fixed and the other rotated by a vertical shaft, are placed face to face. Usually the upper stone is the movable one, and has a central hole into which the material to be ground is fed. As this stone is revolved, the material is ground between the stones and passes out through grooves in their faces to the edge, where it is caught by a suitable receiver.

The best representatives of the ore-grinding machines are the «Huntington» and the «Chilian» mills. Fig. 7 shows a partly sectional detailed view of a Huntington mill. The ore and water fed into the mill at the hopper is thrown against the ring-die by the rotating rollers and scrapers, where it is crushed by the centrifugal force of the rollers to any desired degree of fineness, and then discharged through the screens in the form of a fine pulp suitable for concentration.

Fig. 8 illustrates a «Davis» Chilian mill. It consists of a heavy cast iron pan with an annular die. The periphery of the pan is provided with screens. A vertical driving shaft is journaled in the centre of the pan and is driven from below by bevel gears on a countershaft connected with the driving pulley. Three crushing rolls are driven from the vertical shaft by axle bearings so designed as to allow the rollers to swing in a vertical plane. The material to be crushed is delivered into a central hopper carried on the driving shaft, and is distributed by suitable spouts in front of each roll. Scrapers are provided to prevent packing, and ensure proper circulation for the screens.

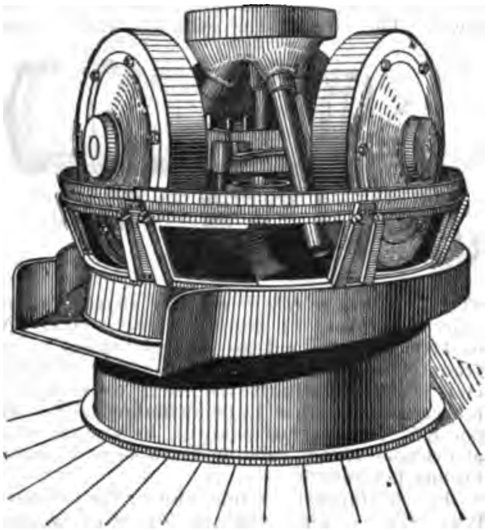


FIG. 8.

Other forms of machines used for fine grinding are the «pebble mills,» «tube mills,» and «ball mills.» Of these, there are two principal types — those in which metallic balls of hardened steel, comparatively large in size, travel around a fixed track, and those in which the balls revolve loosely in a rotating drum. In the former the material is ground between the rotating balls and the path on which they travel, and in the latter, by the constant movement and fall of the balls which are fed into the mill

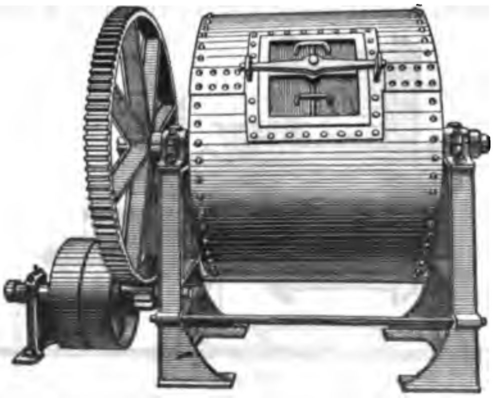


FIG. 9.

with the material. In many forms of these machines pebbles of flint are substituted for the balls of hardened steel.

Fig. 9 illustrates the general form of a pebble mill. The principal dimensions are as follows: The size of the cylinders range from 30 x 19 inches to 6 x 8 feet; the charge, taking sand as the unit of measure, ranges from 120 to 4,000 pounds; and the size of pulleys range from 24 x 4 inches to 36 x 12 inches in diameter. These machines require 1 to 18 horse-power to drive them in dry-grinding, and from one-half to nine horse-power, in wet-grinding at cylinder speeds ranging from 44 to 13 revolutions per minute.

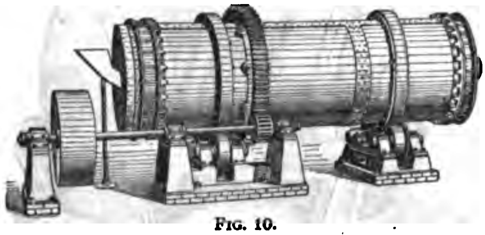


FIG. 10.

Fig. 10 illustrates a tube mill of the ordinary type. The general principle of grinding employed is similar to that of the pebble mills, but with the difference that the material to be ground in the tube mill is fed at one end, and delivered as a finished product at the other end, its fineness being regulated simply by the speed at which the material is fed into the machine. As every particle of the material must pass under the grinding action of the entire charge of pebbles, a thorough and uniform grinding is the result, and the use of sieves is unnecessary.

Fig. 11 shows a vertical cross-section of an "Abbe" ball mill.

Jar-mills, consisting of porcelain jars in which pebbles are rotated together with the material to be ground, are extensively used for the grinding of paints, ink and other chemical compounds. They are composed of one or more grinding jars. Fig. 12 shows a machine of the single jar type. Its outside dimensions are about 12 x 13 inches; it uses a charge of porcelain balls weighing about 22 pounds; and is capable of grinding up to 15 pounds at a charge, when running at 50 revolutions per minute.

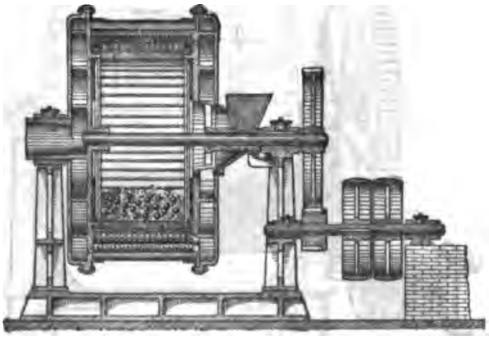


FIG. 11.

Impact pulverizing machines are represented by the "Max" mills and various forms of "Raymond" pulverizers. The principle employed is that of percussion, the working device consisting of a vertical shaft attached to a carrier provided with hardened steel beaters. As the material is fed into the mill it is thrown by centrifugal force against a hard iron plate, the particles at the same time being thrown into violent contact with each other. Equipped with vacuum air separators they are extensively and economically used for the reduction of all kinds of dry colors and chemicals, and for the threshing, cleaning and separating of tobacco stems.

The mechanical apparatus required to effectively apply this system of air separation should be capable of satisfying the following conditions: (1) To expand and rarify the air so that the coarser particles will fall out of the current and allow it to deliver the impalpable powder at the discharge spout. (2) When a large output of the finely ground material is required per hour, the apparatus should be capable of using an amount of air sufficient to lift the total weight of the charge of raw material. (3) When using a large volume of air, sufficient room should be provided for its expansion and rarefaction so as to obtain a current light enough to carry away the impalpable powder only. (4) The apparatus should be so constructed that the coarse particles will fall out of the light air current gravity into the contracted portion of the separator where the blast is stronger, and thus pass out through the tailing spout or into the pulverizer to be reground, without being accompanied by any of the fine powder. (5) The air space within the apparatus should approach as near as possible to a perfect vacuum.

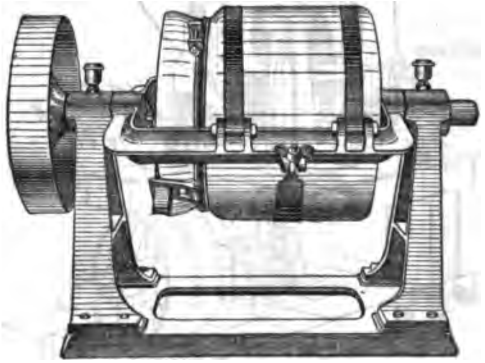


FIG. 12.

As the fineness of the product depends upon the size of the separator, almost any limit of grinding is readily obtained by making the apparatus of sufficient size to produce the proper relative expansion and rarefaction of the air. When it is desired that the finished product should be an extremely fine powder, the use of the large-sized separators will give the best results; but, for products of medium grades of fineness, and large output, the smaller machines with fan and dust collector attachments are the most effective.

Fig. 13 illustrates a Raymond impact pulverizer and vacuum separating plant as erected for the cleaning and separating of tobacco stems. The material is fed to the machine by the operator in a manner similar to the feeding of a threshing machine. The perforations of the screen surrounding the pulverizing cylinder vary in size in proportion to the fineness desired. As the stems come in contact with the rapidly revolving beaters, the particles of the leaf are liberated therefrom, and passing through the screens with the stems are caught by the air current and drawn up into the separator, which expands the air so that all the light pieces of stems drop back and are discharged through the opening at the bottom into the drag elevator. The particles of leaf drop into the centre cone of the separator and discharge from the spout, while the dust is carried through the fan into the dust collector and discharged therefrom.

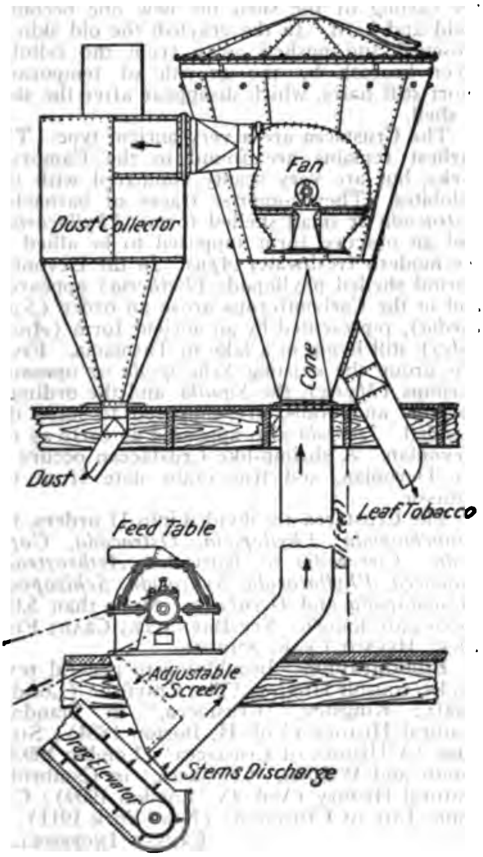


FIG. 13.

Arrastra Machinery.—Arrastra plants are employed for the reduction of metallic ores into a fine pulp which is subsequently treated by the patio or some other process and the pure metal separated from the accompanying impurities. The bottom of the arrastra is paved with stone 10 x 10 inches square, made of the best granite and set vertically to the depth of about three feet in the ground. The outside is constructed of flat stones which project from 18 to 30 inches above the floor. Line shafts driven by engine power extend over this floor and operate poles or arms which revolve and move the "dragging stones" over the granite floor and thus accomplish the reduction of the ore fed into the arrastra to a fine pulp. These stones are made of the best granite, and range in weight from 11,000 to 25,000 pounds. The ore is first prepared by being passed through the jaw-crushers of a primary crushing plant. From these machines it passes through a set of crushing rolls and is dropped automatically into revolving screens which separate the fine pulp from the coarser grindings. The last-named material is sent back and passed again through the crushing rolls until all of the pulp is fine enough to be finally treated in the arrastra. Each arrastra requires about six horse-power for its operation, and range in crushing capacity from 6 to 10 tons each, per 24 hours, according to the character of the ore.

For other forms of crushing and grinding machinery, and their special application, see articles under the titles BRICK MAKING MACHINERY, COAL MINING MACHINERY and MINING AND MILLING MACHINERY.

CRUSIUS, kroo-zē-ŭs, **Otto**, German philologist: b. Hanover, 20 Dec. 1857. He has been a professor in the University of Heidelberg and at München (1903). He has written among other works 'Musiktheorie und Musikgeschichte,' 'Zur griechischen Religionsgeschicte' (1886); 'Untersuchungen zu den Mimiamben des Herondas' (1892); and has also edited 'Philologus; Herondas' (1901); 'Fabeln des Babrius' (1897); 'Griechische Lyriker' (1897).

CRUST OF THE EARTH, a term formerly in much use to indicate the solid shell of the earth that covered the supposed molten interior. More recently it has come to be believed that the earth is probably solid throughout, and the term Crust has lost its original significance, and is not much used by scientists, though it is still widely retained popularly for what is more properly called the lithosphere. For the conditions that obtain in the lithosphere see ROCK FLOWAGE; ROCK CLEAVAGE; FAULTS; JOINTS; MOUNTAINS; also GEOLOGY, *Geognosy*.

CRUSTACEA, krŭs-tā'shē-a, a primary group (phylum) of animals represented by the barnacle, lobster, crayfish, shrimp and crab. Crustacea differ from other arthropod animals. The body consists of about 20 segments which in the more specialized forms are grouped into two regions, the head-thorax (cephalothorax) and hind-body or abdomen. The segments of the cephalothorax are fused together so that the limits between the segments are lost, and the whole mass is protected by the shield or carapace. The skin is thick and rendered solid by the deposition of lime (carbonate and phosphate), so that the integument forms a dense crust, hence the name Crustacea. They differ from trilobites and king crabs in having two pairs of antennæ, while they breathe by means of gills attached to the legs. Like the other marine arthropods named, they have legs which are divided into two divisions, an outer (exopodite) and an inner (endopodite). Crustacea differ also from the *Palæopoda* (trilobites, merostomes and arachnids) in the high degree of specialization of their appendages, there being three to six kinds, with corresponding functions, while in the trilobites, so far as we know, the single pair of antennæ are succeeded by numerous (over 20) pairs of legs, all of the same shape and functions. In the head-thorax, besides the antennæ, there is on each side of the mouth a pair of mandibles, each with a palpus, two pairs of maxillæ or accessory jaws, which are flat, divided into lobes, and of unequal size; three pairs of foot-jaws (maxillipedes), which differ from the maxillæ in having gills like those on the five following pairs of legs. There are thus 13 pairs of cephalothoracic appendages, indicating that there are 13 corresponding segments; these, with the seven abdominal segments, indicate that there are 20 segments in a typical crustacean. There are six pairs of swimming legs (swimmerets), the last very broad in the lobster and shrimp, with the telson forming the «tail-fin.»

The Crustacea as a rule respire by gills. These, as in the lobster and crab, are composed of a series of little filaments into which the blood flows to be aërated. The filaments branch out from a common stalk which grows out of the basal joint of the five pairs of legs and the three pairs of foot-jaws. These gills are folded up toward the back, and are contained in a sort of chamber made in part by the carapace. In shrimps, lobsters and crabs the sea-water passing into the cavity between the body and the free edge of the carapace is afterward scooped out through an opening or passage on each side of the head by the movements of membranous flaps called «gill-bailers.» The digestive organs are well developed, especially the fore stomach, in the hinder part of which are several very large calcareous teeth for crushing the food, serving, when closed together, as a strainer through which the partly digested food presses into the long slender straight intestine, which ends in the telson. The liver is very large, as in all marine arthropods, or in such terrestrial types as the scorpions and spiders, which are derived from the king crabs. The brain of the higher Crustacea is very complex, corresponding with the complicated reflex movements of an animal composed of so many segments, and bearing such a complicated series of appendages devoted to so great a variety of functions. The eyes are usually compound or many-faceted, and are mounted on freely movable stalks. The ear is a sac in the basal joint of the smaller or second pair of antennæ. The organs of smell are usually well developed, as Crustacea mainly depend on this sense in finding their food. These consist of minute delicate sensory rods on the smaller antennæ. The hairs fringing the mouth-parts and legs are often delicate tactile organs. The green glands in the head function as kidneys, and open out at the base of the larger antennæ.

With only a single known exception (*Squilla*), Crustacea carry their eggs about attached to the swimming or other legs. The eggs of some crabs (*Neptunus*) are minute and excessively numerous, their number amounting to millions, while the lobster may produce from 20,000 to 80,000 eggs. Crustacea pass through a well-marked metamorphosis, nearly all (except the amphipods and isopods) hatching from the egg as a larva called «nauplius,» which has an oval non-segmented body, with three pairs of appendages, by which it swims about at the surface of the sea. After a series of molts, at each of which new segments with their appendages arise, it finally reaches maturity. The shrimps and crabs hatch in a more advanced larval stage called «zoëa,» the nauplius stage being partly suppressed and thrust back into the embryo period. The zoëa has a head and abdomen, but no thorax: this, however, is developed later, and after a series of molts the parent form is attained.

The process of molting is a precarious one, not infrequently resulting in death. The crust being too solid to admit of a continuous growth, and increase in size being rapid, frequent sheddings of the skin are necessary. In the lobster, the old skin being detached from the under cellular layer by the secretion of the new cuticle beneath, ruptures between the thorax and abdomen, and the lobster draws itself out of the rent, shedding not only the entire skin and every hair, but also the lining of the mouth, throat and fore stomach, and likewise the outlet of the intestine. In about three weeks after the casting of the shell the new one becomes solid and hard. In the crayfish the old skin is loosened and pushed away from the cellular layer beneath by the growth of temporary, short stiff hairs, which disappear after the skin is shed.

The Crustacea are a very ancient type. The earliest remains are found in the Cambrian rocks, but are very scanty compared with the trilobites. They comprise traces of barnacles, *Ostracoda* or small shelled forms, *Phyllocarida*, and an obscure form supposed to be allied to the modern freshwater *Apus*. In the Devonian Period shelled phyllopods (*Estheria*) appeared, and in the Carboniferous arose an order (*Syncardia*), represented by an ancient form (*Anaspides*) still living in a lake in Tasmania. From this group the existing *Schizopoda* or opossum shrimps (*Mysis*), the *Squilla*, and the ordinary shrimps and crabs, are supposed to have descended. *Isopoda* also appeared as early as the Devonian. A shrimp-like Crustacean occurs in the Devonian, and true crabs date from the Jurassic.

The Crustacea are divided into 11 orders, the *Branchiopoda, Phyllopoda, Ostracoda, Copepoda, Cirrepedia* or barnacles, *Arthrostraca, Cumacea, Phyllocarida, Syncarida, Schizopoda, Stomatopoda* and *Decapoda*. More than 5,000 species are known. See BARNACLE; CRAB; FISH LICE; HERMIT CRAB; SHRIMP.

Bibliography.— In addition to general text-books, consult Huxley, 'The Crayfish' (London 1880); Kingsley, 'Crustacea,' in Standard Natural History (Vol. II, Boston 1884); Stebbing, 'A History of Crustacea' (London 1893); Smith and Weldon, 'Crustacea,' in Cambridge Natural History (Vol. IV, London 1909); Calman, 'Life of Crustacea' (New York 1911).

ERNEST INGERSOLL.

CRUTCHED FRIARS. See ORDERS, RELIGIOUS.

CRUVEILHIER, krü'vā'lï-ā', **Jean**, French anatomist: b. Limoges, 9 Feb. 1791; d. Jussac, 6 March 1874. He obtained in 1824 the chair of pathological anatomy in Montpellier and in 1826 in Paris. He published an important work 'Essai sur l'anatomie pathologique en général' (1816); and an expansion of this in five volumes. His other works include 'Anatomie Descriptive' (in 3 vols., 1833–38); 'Anatomie du système nerveux de l'homme' (1845).

CRUZ, kroos, **Cano y Olmedilla, Ramon Francisco de la**, Spanish dramatic poet: b. Madrid 1731; d. 1799. He rescued the native Spanish drama from an inundation of French influence. A marvelously prolific writer, he

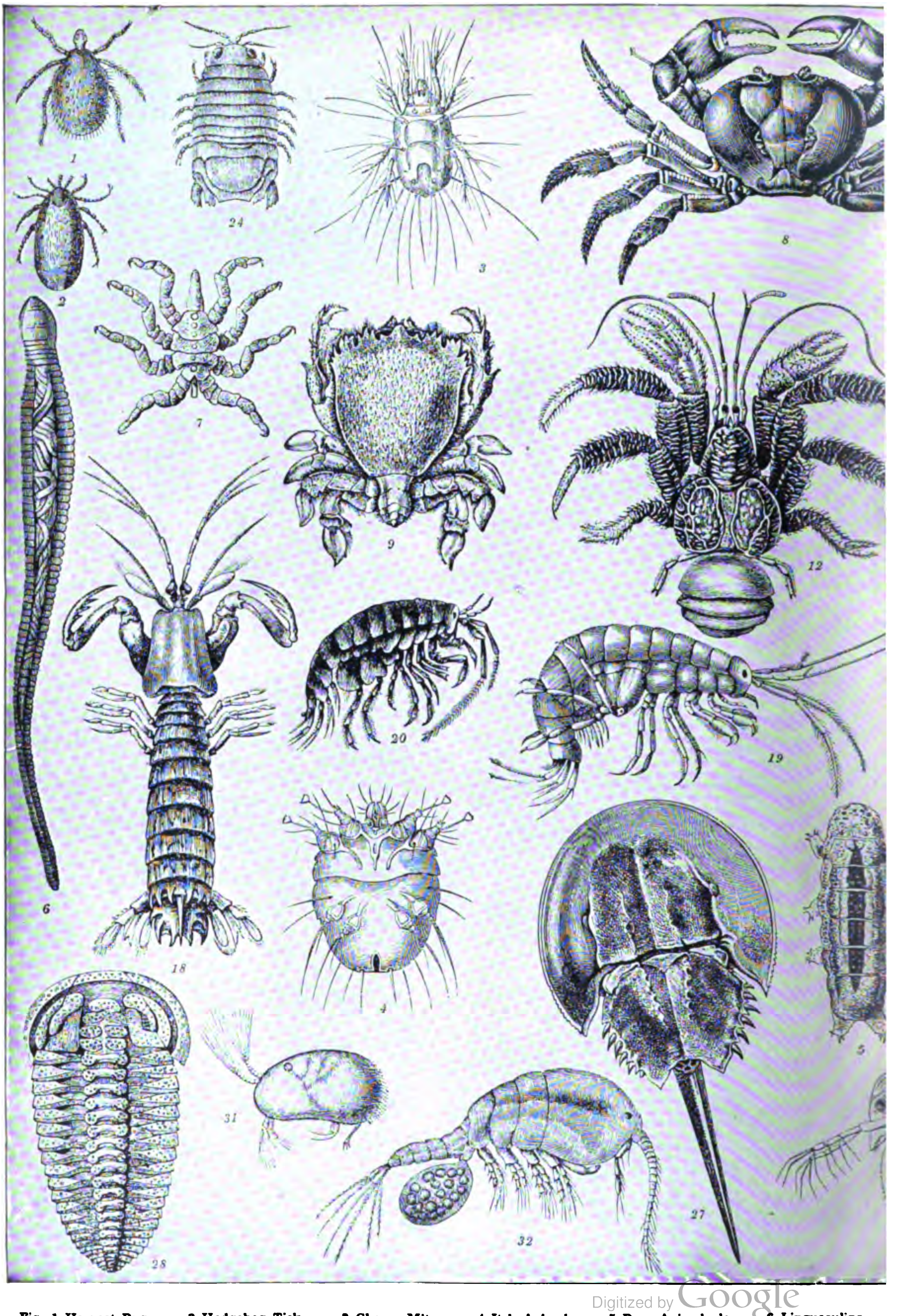
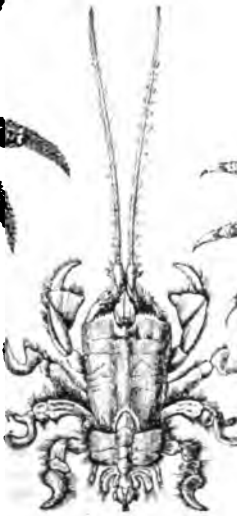


Fig. 1 Harvest Bug 2 Hedgehog Tick 3 Cheese-Mite 4 Itch Animal 5 Bear Animalcule 6 Linguarulina
14 Plated Lobster 15 Spiny Lobster 16 Crayfish 17 Prawn 18 Squill, or Mantis Shrimp 19
25 Fish-Louse 26 Icne 27 Limulus, or King Crab 28 Trilobite



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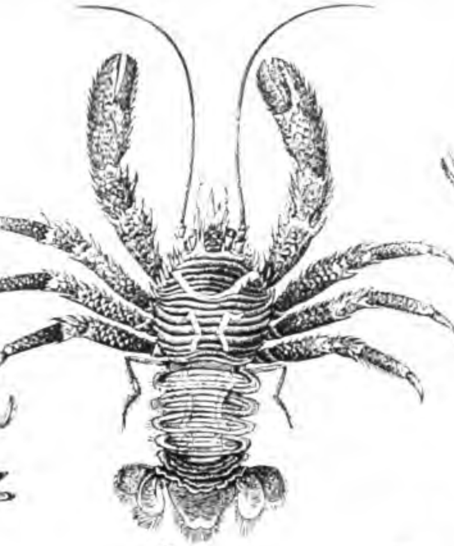

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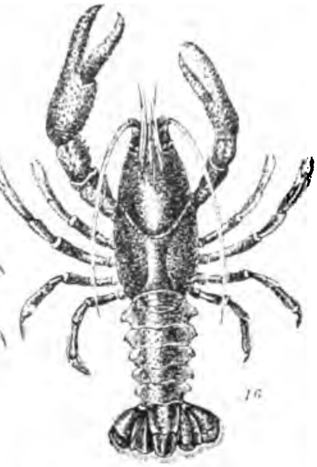

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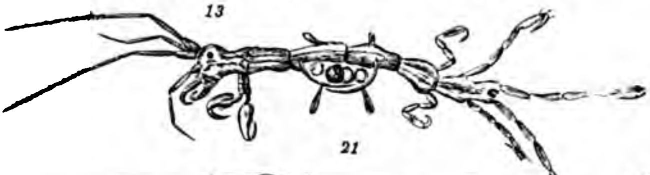

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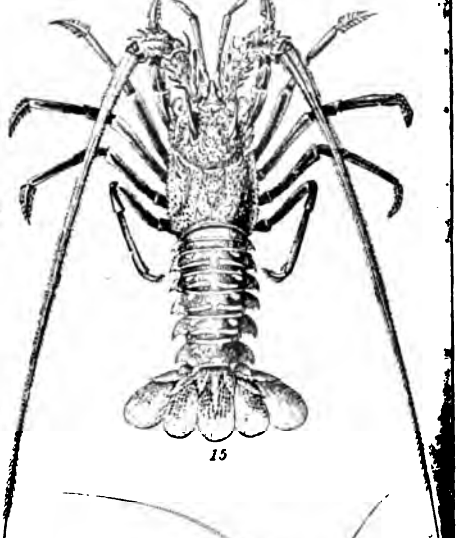

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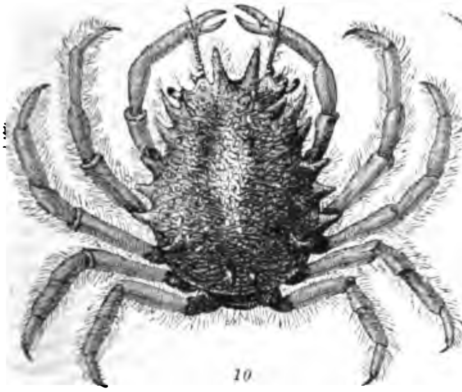

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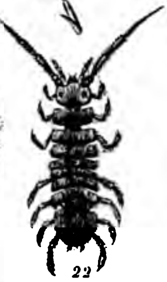

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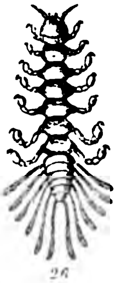

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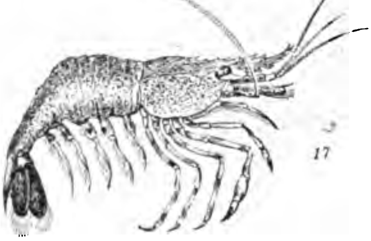

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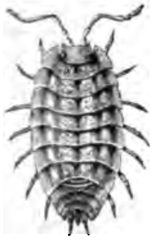

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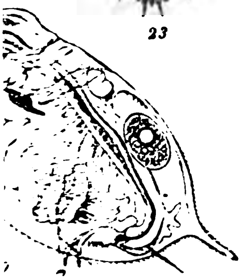
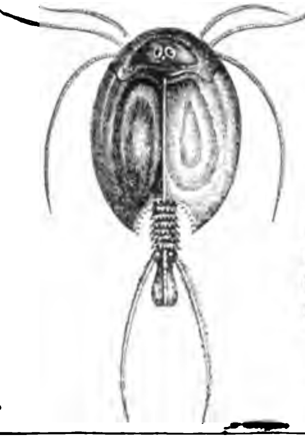
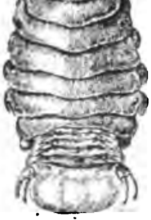
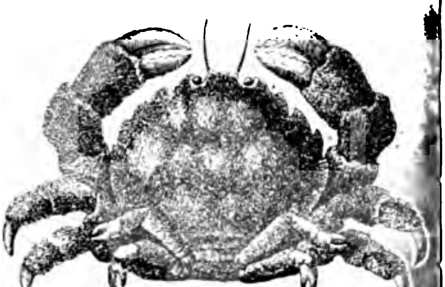








7 Sea-Spider 8 Land-Crab 9 Frog-Crab 10 Spider-Crab 11 Wooly-Crab 12 Purse-Crab 13 Albunea
shwater Shrimp 20 Hermit Screw 21 Caprella 22 Isopod 23 Wood-Louse 24 Sphaeroma
29 Apus, or Shield-Shrimp 30 Water-Flea 31 Cypria 32 Cyclops

produced some 500 pieces in all departments of dramatic composition. Classical drama, comedy, farce, zarzuela and a mixture of classical drama, more especially of the French school; and he translated and adapted plays from Italian and French. But he gradually learned to trust himself. So prolific was he, so devotedly did he work and so endless were his literary and dramatic resources that he has been called the Lope de Vega of the 18th century. He worked for all the theatres of Madrid; and often a week or less was for him sufficient time in which to write a play or zarzuela. This work he kept up constantly for 30 years. The years following his death it was the custom to belittle his work; but the critics of to-day are finding, in his dramas, the mirror held up to the Spanish life of the 18th century, and they are beginning to understand what De la Cruz meant when he said of himself: «Truth dictates and I write»; for his works are a vast and rich treasury of information relating to the life and customs of the age in which he lived and which he knew thoroughly. In rescuing Spanish drama from foreign influence and in developing the zarzuela, or musical comedy, and the sainete and other short and especially Spanish plays, he led the way for the modern renaissance of the Spanish drama. Consult Cotarelo y Mori, ‘Ramon de la Cruz y sus obras’ (Madrid 1899).

CRUZ, San Juan de la (Saint John of the Cross), Spanish mystic and poet: b. Fontiveros, Old Castile, 1542; d. Ubeda, 14 Dec. 1601. He was a Carmelite friar. His real name was Juan de Yepes y Álvarez. He became an ardent supporter of Santa Teresa who was attempting to reform the order of Carmel. In this work he found himself constantly in trouble and finally he died in exile. His prose writings on the inner life won for him the title «The Ecstatic Doctor»; famous among them is ‘The Soul's Darksome Night.’ In form and spirit his poetry is noble, deep and inspired by profound feeling; but he is often so mystical that it is difficult to understand him. The great beauty and harmony of his prose won for him many admirers; and the strong religious fervor of his works, probably more than anything else, led to canonization in 1726. His ‘Obras espirituales’ stand in the fore-rank of the Spanish mystics. Probably no other Spanish mystical writings have such sustained lofty expression. This and various of his other works have been translated into French and have been printed and reprinted in many forms. Among his other notable works are ‘Noche oscura del Alma’ and ‘Subida del Monte Carmela.’ Consult Dominguez Berruete, M., ‘Elmisticismo de San Juan de la Cruz en sus poesiás’ (Madrid 1894). His complete ‘Spiritual Works’ were first published in 1619, and in a 12th edition in 1703.

CRUZ Y GOYENECHE, kroos-ē-gō-yā-nā'chā, **Luis de la,** Chilean military officer: b. Concepción, 25 Aug. 1768; d. near Valparaiso, 14 Oct. 1828. He explored the Andes in 1806, discovering several important mountain passes, which are described in a report published in the Angelis collection at Buenos Aires in 1835. He bore a leading part in the revolution against Spain, commanding a regiment and falling into the hands of the enemy, but was liberated in 1817. He next became a political leader of the young republic, serving for a time as acting President of Chile. He was invested by Peru with the dignity of grand marshal. Shortly before his death he was appointed Minister of Marine.

CRYOLITE, krī'ō-līt (Gr. «ice-stone,» in allusion to its translucent whiteness), a native fluoride of aluminum and sodium, having the formula $3NaF.AlF_3$. It crystallizes in the monoclinic system, and also occurs massive. It is transparent or translucent, and the purer varieties are colorless or white. Its lustre is vitreous, and it has a hardness of 2.5 and a specific gravity of about 3. The best-known deposit of cryolite is in West Greenland, whence large quantities of it have been taken for use in the preparation of metallic aluminum. Less important deposits are also known in the Urals, and in El Paso County, Colo. Cryolite is also used in the manufacture of alum, soda and certain kinds of glass, notably the so-called «milk-glass,» or hot-cast porcelain, which is composed of cryolite, silica and oxide of zinc. The only commercial supply of cryolite is the great mine at Ivigtut, where two grades are produced, known to the trade as «white cryolite» and «black cryolite.» The discoloration of the latter is due to its large admixture of fluorite. In recent years only the black cryolite has been imported into the United States. The importations for 1916 amounted to 3,857 tons, valued at $42.84 per ton, as compared with 3,949 tons valued at $21 per ton for 1915. The latter price is about the average for the last 10 years, the increased price for 1916 being due to the greatly advanced rates for ocean tonnage caused by the war. An excellent description of the cryolite mine at Ivigtut may be found in *The Mining Magazine* (London) for April 1916. Consult also United States Geological Survey, ‘Mineral Resources of the United States, 1916’ (Part II).

CRYOPHORUS, krī-ŏf'ō-rŭs (Gr. «ice-bearing»), a simple instrument devised by Wollaston for illustrating the freezing of water by rapid evaporation. The instrument consists of a bent tube of glass, provided with a bulb at each end. A small quantity of water is placed in it, and boiled until the air is entirely expelled and replaced by steam. The tube is then hermetically sealed. In using the instrument, the water is brought into one of the bulbs, and the other, containing only water-vapor, is placed in a freezing mixture. The vapor condenses rapidly in the chilled bulb, and a correspondingly rapid evaporation is induced in the other one. The formation of vapor, however, is attended by the absorption of large quantities of heat; and the water in the free end of the apparatus, being the chief source from which this heat is obtained, presently becomes chilled to such a degree that it freezes.

CRYPT, in architecture, a cell or vault constructed underground. The galleries of the catacombs and the catacombs themselves were known by this name in the early Christian era. The underground tombs of the Christian martyrs were so called where the early Christians met to perform their devotions, for fear of persecution. Hence crypt came to signify a church underground, or the lower story of a church, which may be set apart for monumental purposes, or used as a chapel. It came to occupy the entire space under the choir; and often the part of the church above it was elevated and approached by flights of stairs, in order to give height to the crypt. The crypt is not common in churches built after the Norman period and when found in those of the Gothic period is usually much older than the structure above them. The position of a crypt is generally beneath the choir, but occasionally, as at Glasgow Cathedral, beneath the transept also. The largest crypt in England is that at Canterbury Cathedral. Crypts rarely occur as a feature of a parish church. The larger crypt at Glasgow Cathedral is entirely above ground and at one time was used by itself as a church. In Germany, these underground chapels are numerous — the ones at Göttingen, Strassburg and Naumberg are fine examples of architecture. The most remarkable crypt in Italy is that of Saint Mark's, Venice, which is in the shape of a Greek cross. Short columns support low arches on which the floor above rests. Other Italian crypts are at Brescia, Fiesole, Modena, Milan, Pavia, Verona, Florence; and a particularly fine one at Assisi. A good example of Norman crypt is to be seen at the church of the Holy Trinity at Caen, France. In this country there are notable crypts at Saint-Chapelle, Paris, and at Saint Gervase, Rouen. Later churches abolished the necessity for this form of chapel.

CRYPTIDINE, krĭp′tĭ-dīn ($C_{11}H_{11}N$), a base homologous with quinoline, obtained in the preparation of that body, and also found in the less volatile parts of coal-tar. Its boiling-point is about 525° F., but it has not yet been prepared perfectly free from its lower homologues. It forms a double salt with platinum.

CRYPTO-CALVINISTS, name given to Melanchthon and those who agreed with him in wishing to unite the Lutherans and Calvinists, and especially in his supposed leaning toward the Calvinistic view of the Lord's Supper as shown in the difference between the original and the altered Augsburg Confession (q.v.). The former said «The body and blood of Christ are truly present in the Lord's Supper in the form of bread and wine and are there distributed and received by the communicant; therefore the opposite doctrine is rejected.» In the latter the last clause is omitted. Luther did not approve the alteration, but tolerated Melanchthon's change of doctrine. Many, however, called him a Crypto-Calvinist. The truth seems to have been that he did not consider that either opinion was a sufficient bar to communion with Christ and therefore thought that both of them ought to be allowed. The controversy was becoming violent before his death, but afterward it broke out with great virulence, and continued with alternate success for 50 years, during which time frequent attempts were made to suppress the Calvinistic opinions by imprisoning their leading advocates and at last, in 1611, by the execution of Chancellor Nicolas Crell. The term has also been applied to the Missouri Lutherans because of their acceptance of the doctrine of unconditional election. Consult Richard, ‘‘Philip Melanchthon’ (New York 1898).

CRYPTOBRANCHIDÆ, krĭp″to-brăn′kĭ-dē (Gr. «with hidden gills»), a family of urodele *Amphibia* (q.v.) most nearly related, according to Cope, to the *Amblystomidæ*. There are no gills in the adult, but a single pore-like branchial fissure may persist on each side. Respiration is pulmonary, but the inspirations occur only at intervals of several minutes. The vertebræ are biconcave but, like the remainder of the skeleton except the cartilaginous carpi and tarsi, are well ossified. There is no ethmoid bone, and the internal ear is separated from the brain by membrane only. A maxillary bone is developed, and teeth are borne on the margins of both jaws, as well as on the vomers, but not on the parasphenoid. The eyes are very small and devoid of lids; two pairs of limbs with four and five digits respectively are always present, and the tail is permanently provided with a fin. Two genera are known: *Megalobatrachus*, which has no branchial opening and contains only the giant salamander of eastern Asia, and *Cryptobranchus*, which contains the American hellbenders (q.v.).

CRYPTOGAMOUS PLANTS or **CRYPTOGAMS** (from Gr. κρυπτός, hidden + γάμος, marriage), all plants below the Phanerogams or flowering plants. The names were first used by Linnæus, who may thus have indicated his conviction that all plants possess sexuality, as most of them do. For a long time the vegetable kingdom was divided into two groups, as follows: (1) *Phanerogamia*, with stamens, ovules, seeds and embryos. (2) *Cryptogamia*, without stamens, ovules, seeds and embryos, and with spores. These distinctions, although long since acknowledged to be unscientific, are still maintained, especially in popular usage. The Cryptogams, instead of being a single group co-ordinate with the Phanerogams, include several such groups, namely, Algæ and Fungi (*Thallophytes*); Mossworts (*Bryophytes*); Fernworts (*Pteridophytes*). The Bryophytes and Pteridophytes are more closely related to one another and to the Phanerogams than to the very heterogeneous assemblage of the Thallophytes, the green members of which are known as algæ, while those without chlorophyll are mostly called fungi. For more detailed accounts of the cryptogams, see the articles on the special groups just mentioned.

CRYPTOGRAMS. See Cipher Writing.

CRYPTOMERIA, krĭp-tō-mē′rĭ-ạ (Gr. «with hidden parts,» its seeds being concealed in bracts), a beautiful tall-growing conifer, known also as the Japanese Cedar. The tree grows in the mountainous regions of China and Japan, and many varieties are cultivated. It was introduced into Europe in 1844, and is now widely cultivated. It is closely allied to the *Sequoia* (q.v.).

CRYPTURI, krĭp-tū′rĭ (Gr. «hidden tail,» because of the rudimentary tail), an order of birds, sometimes called the *Tinami* or *Tinamiformes*, from their native name tinamou, generally regarded as *Ratitæ* (q.v.) but placed among the *Carinatæ* (q.v.) by those who regard the presence of a keeled sternum as of greater classificatory value than the desmognathous palate. Besides the characters just mentioned, which are combined in no other known birds, other remarkable osteological features are the complete union of the vomer and palatine bones, the single articular head of the quadrate, the rudimentary tail skeleton (pygostyle), the ostrich-like pelvis and legs (but not feet), and the well-developed clavicles, all but the last being ratite characters. The quill feathers of the tail are 10 or 12 in number and completely hidden beneath the coverts; the wings, which are very short and concave, have 10 primary and from 13 to 16 secondary quills; contour feathers are of the ordinary type found in flying birds, with the aftershaft rudimentary or absent. There are three long anterior toes with claws like a pheasant's, and the hallux is short and elevated, or, very rarely, absent; in fact the feet are of a strictly gallinaceous type. About 9 or 10 genera and 70 species are known, all but six of which are South American, occurring especially in Argentina and Brazil. See TINAMOUS.

CRYSTAL. The term crystal, derived from a Greek word signifying a hard crust, or more specifically ice, was applied by the Greeks at least 400 B.C. to a material which they supposed to be a hard, durable form of frozen water. This substance is the colorless, transparent variety of quartz still called rock crystal and this belief as to its nature lasted into the 16th century. The angular forms and the smooth, even surfaces of this substance were observed by the ancients, but were regarded either as accidents or as shapes «pleasing to the gods.» The polyhedral solids obtained by the evaporation of solutions were also thought to be ice and therefore called crystal, although the error was earlier realized, for not only was crystallization recommended by Geber in the 8th century as a means of purification but the shapes of the crystals were to some extent recognized as characterizing the salt.

The secondary meaning of polyhedral form, solids bounded by plane faces, was therefore associated with the original meaning of frozen water and clear ice-like appearance and by a natural association of ideas other minerals, such as beryl, diamond, garnet and pyrite, which were observed to occur frequently in angular forms, were spoken of as crystal-like, or crystalline, and when, toward the close of the 18th century, the study of the shapes was first systematically undertaken, Romé de l'Isle called the new science crystallography (q.v.). That is, the word crystal no longer meant the transparent, ice-like substance, rock crystal, but an individual solid of any substance, whether transparent or opaque, provided this solid was bounded by plane faces at definite angles, and was formed as a result of the solidification of the substance.

This definition however is not fundamental and does not touch the essential nature of a crystal and while still held to by some authorities it can only be consistently maintained by the creation of some new term to include all individuals possessing that character which distinguishes crystals from all other bodies, namely, homogeneity of internal structure. The limitation to plane faced solids was due to the fact that external form was long the only character studied and even this character is a direct consequence of a regular internal structure, and, although it is a striking proof of this, it is often dependent upon comparatively minor conditions at the time of solidification.

All individual solids formed at the solidification of a substance, whether they are completely bounded by planes or partially bounded by planes or lack such boundaries and are of a shape determined by the space in which they formed exhibit equally well phenomena which prove the regular internal structure. For instance, characters such as transmission of light, the conductivity of heat, the cohesion, the elasticity or the rate of solubility are always alike in parallel directions, and, generally speaking, unlike in directions which are not parallel. Or if alike in more than one direction these directions will (whatever the boundary of the individual) bear the same relations.

The general usage now is to include the faceless and partially faced individuals, either with or without a modifying term, under the term crystal, one suggestion being to distinguish them as anhedral or faceless crystals, and the following definition of Fock expresses this tendency: A crystal is «a homogeneous solid body of definite chemical composition, whose physical properties are the same in parallel directions, but are generally different in directions not parallel.» The outward sign is the form, but its destruction does not rob the fragments of their perfect internal structure, whereas the most perfect model is not a crystal, because it lacks the internal physical characteristics.

A further modification of the definition will be needed if the doubly refracting liquids described by Lehmann are admitted to be assemblages of liquid crystals. There is no definite limit between solid and liquid. In some of the softer solids one layer may be made to glide over another by pressure as in calcite and ice, other solid crystals are pliable, iodide of silver at 146° C. will flow like a thick liquid yet retain many crystal properties and certain organic substances which possess the mobility of oil or water and yet show double refraction dichroism, interference figures and even polyhedral form are difficult to exclude. The definitions thus far limit crystals to solids; whether this limit will be sufficiently removed to include the so-called «liquid crystals» is still in doubt.

The External Form of Crystals.—Although some differences between the shapes of crystals of different substances had been noticed and these differences utilized in descriptions of minerals and salts, the general belief, as late as the 16th century, was that the shapes in which any one substance occurred were neither constant nor related to each other.

In 1669 Nicolas Steno, a Danish anatomist, announced that the angles between corresponding faces of different quartz crystals were constant no matter how much the crystals varied in shape. This constancy of angles was stated by Guglielmini in 1704 to be general, in that every salt had its peculiar crystals, the angles of which were constant even when the crystals were imperfect and broken.

That in addition to the constancy of angles between corresponding faces there was an intimate relation between the very different shapes often assumed by crystals of the same substance was first shown clearly by Romé de l'Isle, who, continuing the method of Linnæus, measured and made wooden models of different crystals and in 1783 described over 400 regular forms. As a result of his comparisons de l'Isle found that differently shaped crystals of any one substance always formed a series and that all the members of such a series could be derived by «modifying» one so-called «primitive form,» the shape and angles of which varied with the substance, by particular methods, such as replacing each edge by one plane or by two planes, or each solid angle by one, three, four or six planes.

Réné Just Haüy, either as the result of an independent discovery or in view of the fact that Torbern Bergmann in 1773 had shown that calcite could be cleaved or broken into little six-faced fragments with constant angles and that these rhombohedral fragments could be built together again into the different observed shapes of calcite, assumed this property of cleavage to be general and instead of the arbitrarily chosen primitive form of de l'Isle he chose for each substance a primitive form the faces of which were parallel to directions of cleavage, or if no cleavage was found or cleavage only in one direction, he assumed a shape determined by striations or other markings or by analogy between the shapes of the crystals of other substances which did show cleavage.

More important than this however he laid the foundation for the great law of "simple mathematical ratio" by showing that the angles made by the secondary planes were not arbitrary, but always fulfilled certain conditions, and were not simply grouped in the same way at each corresponding edge or angle but were at exactly those angles which would result if upon the primitive form little "integrant molecules" of shapes determined by cleavage were built up in successive layers, each successive layer regularly diminishing from the subtraction of one or more rows, always some simple rational number, never to his knowledge exceeding four.

Professor Weiss of Berlin in 1809 discarded Haüy's hypothesis of decreted rows and substituted the conception of imaginary axes "around which the crystal is uniformly disposed." He divided all crystals into groups dependent upon the relative inclinations of the axes. The primitive forms of Haüy he constructed by planes intersecting all the axes or parallel to one or to two of them. If a primitive form cut three axes at distances *a*, *b* and *c* from the centre, then all secondary forms could be constructed by taking points along each of the axes at twice, three times and four times, etc., the lengths *a*, *b* and *c*, and constructing planes in the same way as before. That is, the intercepts of any secondary face in terms of *a*, *b* and *c* were rational, such as $2a : b : 3c$ or $a : 3b : 2c$.

Symmetry, or the repetition of equal angles or similarly grouped faces, was made a crystal character by de l'Isle in his statement, "Every face has an opposite parallel face." In any de l'Isle or Haüy series each form was derived by equivalent changes of *each* similar edge or angle of the primitive form, therefore without change of symmetry, that is "All crystals of any one substance are of the same grade of symmetry." Hessel in 1830, Gadolin in 1864, and von Lang in 1867 considered the possible varieties of symmetry of polyhedrons when limited by the law of rational parameters. Each obtained 32 types or classes.

It may be said then briefly that, with respect to external form, the crystals of any one substance will have the same symmetry, which will be one of the 32 types, that the angles between corresponding faces will be constant, and that the possible shapes will constitute a series in which the positions of the faces are not arbitrary, but fulfil certain conditions (the law of rational parameters).

The methods by which angles are measured and symmetry symbols and constants determined are described in brief in the article on CRYSTALLOGRAPHY.

The Dependence of Physical Behavior upon Direction in Crystals as Evidence of Regular Internal Structure.—The physical behavior of a crystal varies in the direction in which the test is applied. Like effects are obtained in directions which are parallel in the crystal and, generally, unlike effects are produced in directions not parallel, and like effects are obtained in directions symmetrically related in the crystal form. All this may be interpreted as similar molecular arrangement in directions giving like effects and differing arrangement in directions giving unlike effect.

These facts were suggested toward the close of the 17th century by the results of the studies of calcite made by Bartholin and Huyghens, which may be summed briefly as follows: A ray of light transmitted through calcite in any direction, except one, is split into two rays usually following different paths so that an object viewed through calcite appears double.

The divergence of these paths (roughly shown by the distance apart of the images) varies with the direction. In one direction, *which is also the direction of the principal axis of geometric symmetry*, there is single refraction only, and in all directions equally inclined to this direction of single refraction the double refraction (shown by the distance apart of the images) is the same.

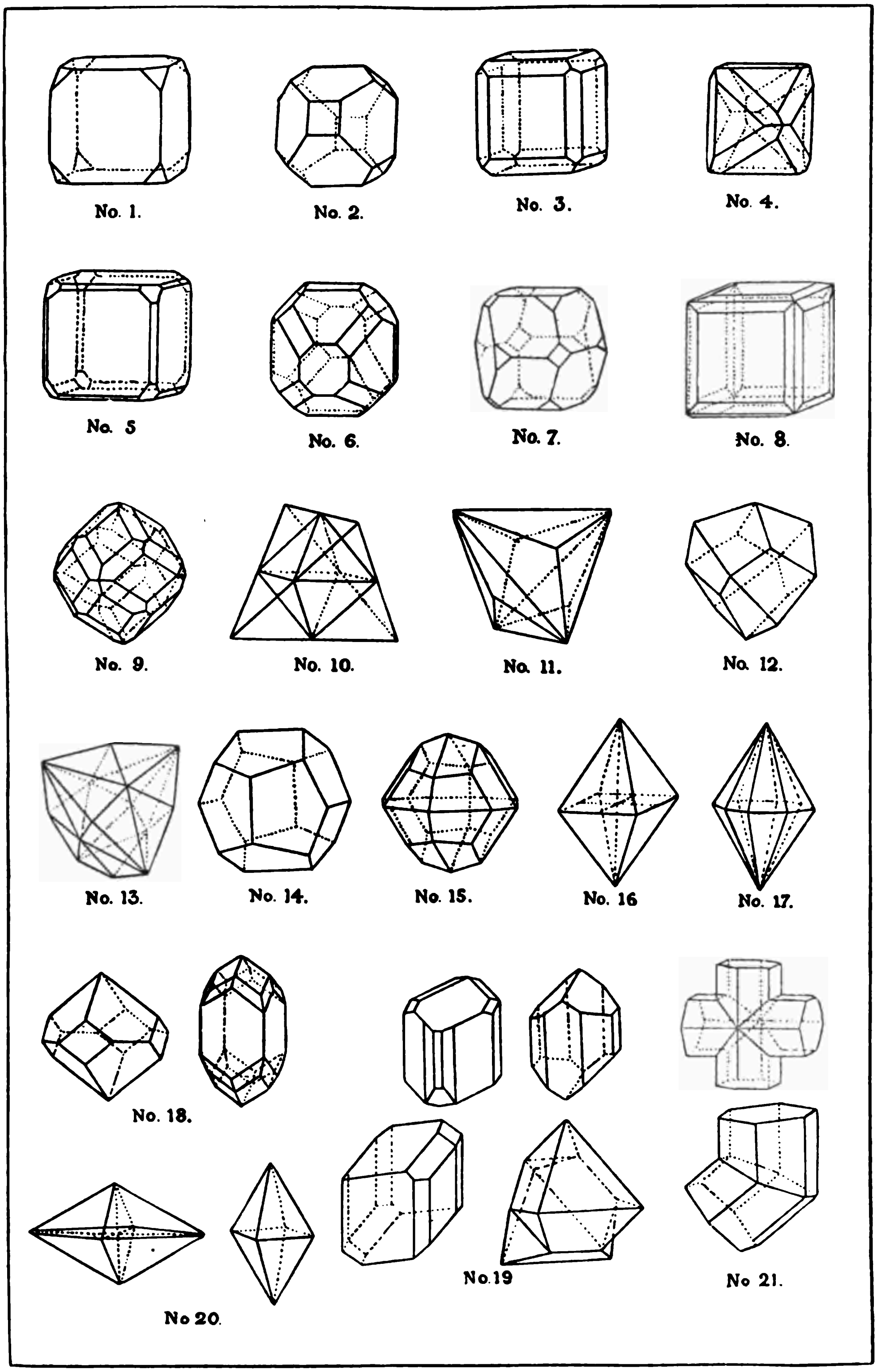
If polarized light, in which the vibration direction is known, is transmitted through crystals, many proofs of the dependence of the effects upon the direction and upon symmetry can be obtained, the regularly varying indices of refraction, the vibration directions of the transmitted light, the differences in absorption and color — in fact, by these effects the symmetry can be accurately judged.

Even with very primitive apparatus Brewster and others obtained before 1820 the so-called "interference figures," color rings of various shapes crossed by dark bands, and Brewster was able to classify nearly all those substances to which Haüy had assigned "primitive forms" and to correct several errors in classification made by the latter. Furthermore, these results were obtained in particular crystallographic directions and the distribution of color and shape of the figures were symmetrical to the planes and axes of geometrical symmetry of the crystals.

A striking proof of the dependence of optical behavior upon direction and of a relation between this and crystalline form is shown when polarized light is transmitted through quartz crystals in the direction of the prism axis. In this direction and in this direction only in all such crystals the emerging ray is polarized in a different plane from the entering ray, or, as it is usually stated, quartz crystals rotate the plane of polarization a definite number of degrees, dependent upon the thickness. But when crystals of quartz which show the less common faces are examined it is seen by the arrangement of these faces that there are two sorts of crystals, the faces of which are relatively like the right and left hand, and Herschel and Brewster in 1821 showed that the plane of polarization was turned to the right by the one sort of quartz crystal and to the left by the other.

The dependence of physical behavior upon

CRYSTALS



1, 2 Combinations of Hexahedron and Octahedron
3 Combination of Hexahedron and Dodecahedron
4 Combination of Octahedron and Dodecahedron
5, 6, 7, 8 and 9 Various combinations of regular systems
10 Derivation of Tetrahedron from an Octahedron
11 Trigonal Dodecahedron
12 Deltohedron
13 Hexoctahedron
14 Pentagonal Dodecahedron
15 Dyakisdodecahedron or Diploid
16 Tetragonal Deuteropyramid
17 Ditetragonal Pyramid
18 Tetragonal Combinations
19 Triclinic
20 Rhombic Pyramids
21 Twin Crystals

direction in crystals is not limited to optical phenomena, for instance, spheres of quartz when uniformly heated expand with regularly varying inequality into ellipsoids of rotation, the direction of the principal symmetry axis of the crystal being the axis of rotation. A sphere of glass or opal would have expanded as a sphere.

A very remarkable instance of dependence upon direction and its connection with external form is shown by crystals in which there are different groupings of planes about the opposite ends of certain axes. These axes are not only "polar" in the sense mentioned, but when the crystal is heated, one end of the axis becomes negatively electrified and the other end positively. This fact was observed in tourmaline crystals as early as 1762 by Æpinus and the same property is shown by calamine, boracite, quartz and other minerals and always with respect to an axis which shows different grouping of planes at the two ends.

That the cohesion of crystals varies with the direction and is equally strong parallel to all geometrically equivalent directions is indicated by several characters. For instance, the directions of least cohesion are frequently shown by the "cleavage" already mentioned under Haüy's discoveries and described in a separate article.

The inequality of the cohesion, except in parallel and similar directions, may also be shown by the variations in hardness and by the cracks developed by punching or pressing with a conical point, and it is especially shown in the "unbuilding" of the crystal, which takes place under the action of a solvent. Solution proceeds with different velocities in different directions in the crystal and if stopped at an early stage the crystal faces are found to be pitted by little angular cavities, the faces of which belong to forms in the same series as the crystal, and not only that but the shapes vary on different faces of the crystal and conform in this and in their shape to the symmetry of the class to which the crystal belongs.

Other characters could be instanced, elasticity, heat conductivity, electrical and magnetic characters and so on, but these are discussed more at length in the article PHYSICAL CRYSTALLOGRAPHY. All observations lead to the same conclusions, that most of the physical characters are dependent upon direction and intimately connected with the external form, or a more exact statement is that the physical characters and the external form are both results of the same cause, a "regular internal structure," which in turn is dependent upon the chemical composition as described in the article on CHEMICAL CRYSTALLOGRAPHY.

THE HOMOGENEOUS INTERNAL STRUCTURE OF CRYSTALS.

That there exist in crystals some homogeneous internal structure has been sufficiently illustrated. The further consideration subdivides into (a) the kinds of homogeneous crystal structure possible, (b) the nature of the structural unit.

The Possible Varieties of Homogeneous Crystal Structure.— The discussion is simplified by the method of Seeber (1824) who substituted for the molecules their centres of gravity. It is then only necessary to consider from a geometric standpoint those types of homogeneous repetition of points in space which conform to the law of rational parameters, and their agreement with the 32 varieties of crystal symmetry already theorized from a consideration of external form.

Such an arrangements of points is called a space lattice in which each point is in a similar position with respect to those surrounding it. Frankenheim in 1842 and Bravais more exactly in 1848 showed that there were 14 different types of space lattice, in each of which the units were parallel and similarly orientated. Each conforms to the symmetry of one of the 32 classes and in each planes through any three points conform to the law of rational parameters.

The broader principle of homogeneity of Wiener (1869), that regular arrangement of atoms consists in every atom having the remaining atoms arranged about it in the same manner, and the method of movements used by Jordan in discussing the possible types of regular repetition in space were applied by Sohncke to the consideration of crystal structure.

Sixty-five regular point systems were obtained, each consisting of two or more identical Bravais space lattices the one thrust within the other, not coincident with it, but either moved parallel to some axis or rotated 180 degrees, 120 degrees, 90 degrees or 60 degrees around this axis, or with both motions.

Finally, von Federow, Schönfliess and Barlow (1890–94) showed that other arrangements of points not identical but similar could be added which "faced the opposite way," that is, were like the mirror repetitions of the preceding groupings. In this way 165 types were added, making in all some 230 "space groups" or types of homogeneous crystal structure each with the symmetry of some one of the 32 crystal classes and for the first time representing all these crystal classes.

The Nature of the Structural Units.— Haüy in 1784 advanced the theory that crystals were built up of little parallelopipeda constant in shape in any one substance but differing in different substances and closely fitted together without interstices.

From that date until comparatively recently, the view has been widely held that the structural unit of the space lattice was an aggregation of chemical molecules called the physical molecule, and that for instance polymorphic substances were due to differences in number of chemical molecules constituting the physical molecule.

This view is definitely abandoned as a result of the increasing knowledge as to the close relations which exist (see CHEMICAL CRYSTALLOGRAPHY) between the crystal structure and the composition. Whether the unit is the chemical molecule in which the position of the atoms is definitely fixed or whether the chemical molecule is not present in the crystallized compound and the unit is merely a group of atoms in equilibrium is not yet quite agreed upon, but later researches indicate that each atom constitutes a point in a space lattice, fixed under one set of conditions and of definite volume but susceptible of change under changed conditions giving different structures and therewith new physical characters. For instance, Bragg's researches indicate that for halite, NaCl, the structure is composed of two intersecting face-centred cubic spaced lattices, the sodium atoms on one, the chlorine atoms on the other, while for fluorite, CaF_2, the calcium atoms are arranged on a face centred cubic lattice and the fluorine atoms are at the centres of the small cubes.

Various theories as to the shapes and relative volumes of the different atoms exist, some of which assume close packing, others the existence of interstices, some base the volume on the atomic weight, others on the valence, and each succeeds in explaining many peculiarities of structure.

Experimental Proof of the Existence of a Regular Internal Structure.— Light rays are diffracted by ruled «gratings» when the intervals between the parallel rulings are of the order of the wave length of light used. Thus sodium light with wave length of .000589 millimeters is diffracted by a ruling of 700 lines per millimeters, that is, with intervals of .00143 millimeters.

Dr. Laue of Zurich conceived the idea of using a crystal as a diffraction grating for X-rays, the waves of which were believed to be very much shorter than those of light and in 1912 by passing a pencil of X-rays through a crystal plate obtained upon a photographic plate not only a strong spot due to the original pencil but a series of other isolated spots which were always arranged in conformity with the symmetry of the crystal and evidently due to reflection from different sets of net planes.

W. L. Bragg showed that for any set of parallel net planes the reflections were obtained only for particular angles of incidence which corresponded to particular intervals between successive planes such that the crests of the reflected waves from each plane agreed, that is, to intervals of 1, 2, 3, etc., wave lengths, whereas for other intervals the different reflected waves tended to neutralize each other. Hence it followed that from the angles and the wave lengths the intervals could be calculated.

The device for measuring these intervals is called an X-ray spectral photometer. A fine pencil of X-rays is directed upon the crystal and the latter is revolved, at certain angles a pencil of rays is reflected into an ionization chamber and its presence being made known by the connected electroscope, the angle is recorded.

Variations in intensity indicate furthermore variation in spacing between similar net planes or lack of similarity between net planes uniformly spaced.

Crystal Growth.— Many strange views have been held as to the causes of crystallization, such as «intense cold,» «divine fire,» «the influence of the stars from which the six-rayed snow crystals come,» «the influence of a particular salt,» and the «motions of organic molecules, especially those derived from the remains of animals and plants.»

Later theories involved the idea of an embryonic period during which the forming crystal lacked characteristic shape. This was based on the study of the crystallization of sulphur from solution in carbon disulphide during which there were observed tiny globules called «globulites,» which according to Vogelsang's theory are liquid spheroids or ellipsoids with a definite internal molecular movement, which renders them capable of mutual attraction. These group themselves in definite forms, sometimes in rows, like strings of beads, «margarites,» and again in needle-like or conical forms, «longulites.» From these develop «crystalloids» of characteristic shape, often doubly refracting, and so on to the complete crystal.

It was found, however, that the globules were carbon disulphide supersaturated with sulphur and prevented from crystallizing by the viscous Canada balsam and moreover that from pure solutions the minutest crystals are the same shapes as the larger ones, as, for instance, when very minute, perfectly formed crystals are obtained by suddenly diminishing the solubility by the addition of another liquid.

It appears from the researches of Miers that there are two distinct varieties of crystallization possible in any cooling fused mass or any evaporating solution, «labile» or spontaneous crystallization and «metastable» or induced crystallization requiring the presence of «germs,» that is, minute crystals of the substance or a related substance. In studying the phenomena he made use of the fact that the refractive indices of solution or fusions varied directly as the saturation and were highest just preceding spontaneous crystallization.

Labile crystallization occurs only with supersaturation or undercooling but in the interval between this and normal saturation or the melting temperature crystals will form by inoculation of the mass with crystal «germs.» This has been experimentally proved both by inducing crystallization by stirring in an open vessel and by failure to induce crystallization either if the substance was new and its germs were not in the room or if the air was excluded as in a sealed tube. In all instances, however, «labile» crystallization occurred.

The germ presumably is an assemblage of parallel molecules, therefore possesses a larger attractive force than the surrounding particles, and if this force exceeds the internal friction will draw to itself and orientate other particles.

Frequently the growth, as observed on a plate of glass on the microscope stage, is relatively rapid in one direction, suggesting a pointed rod pushing its way rapidly into the richer solution, but thickening slowly, because of the impoverished zone surrounding it. As this zone is gradually enriched by the currents, secondary offshoots form and grow in important crystal directions and these in turn send off tertiary offshoots and so on, the tendency being to the creation of skeleton outlines of crystals. As the concentration of the solution decreases the process becomes slower, the hollow places fill and the complete crystals result.

It is sometimes claimed, as showing an analogy between crystal growth and the growth of an organism, that every species of crystal has a definite limit of growth, and that when this is passed new crystal individuals are formed and the old individual grows no further. Exact measurements show that the large crystals do continue to grow, although with the larger surface the growth is less evident. Moreover, if the cooling or evaporation is made sufficiently slow no new crystals are formed, but all the material deposits on the already formed crystals.

Why a substance should vary in the occurring faces of its crystals is not understood. Rapid formation often results in simple forms and slow formation in complex forms. Foreign material in small amounts, if it crystallize with the substance, may cause the development of unusual faces and the simple presence of large amounts of foreign material may have a similar effect.

In conclusion, it may be said the study of crystals is no longer a simple study of external form, but involves questions of the highest interest to the physicist, chemist and geologist. The purely geometric portion, both as relating to varieties of regular structure and to the laws governing the association of faces in the external form, is well advanced, possibly nearly completed. But many facts remain to be explained as to origin, growth, habit, nature of molecules and molecular forces and the relations between chemical constitution and structure. See CRYSTALLINE; CRYSTALLOGRAPHY; CHEMICAL CRYSTALLOGRAPHY; GEOMETRICAL CRYSTALLOGRAPHY; PHYSICAL CRYSTALLOGRAPHY; MINERALOGY.

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CRYSTAL FALLS, Mich., city and county-seat of Iron County, 205 miles north of Milwaukee, on the Chicago and Northwestern and the Chicago, Milwaukee and Saint Paul railroads. It contains a high school and courthouse. Lumbering and iron mining are the chief industries. It received its city charter in 1899 under which the government is vested in a mayor and council. The electric plant and water-works are municipally owned. Pop. 3,775.

CRYSTAL PALACE, a building at Sydenham, England, about seven miles from London. The material in this building was at one time used in the Crystal Palace erected for the World's Fair which was held at Hyde Park, and was formally opened by Queen Victoria, 25 Feb. 1851. The original building was designed by Sir Joseph Paxton; the materials composing it were glass, iron and wood. It cost £1,450,000, and every department of art and science was represented. Its area was nearly 21 acres. In 1854, when the building was about to be demolished, a company formed to purchase it tore down the original and removed the material to Sydenham in Kent, about eight miles from London. The new edifice was patterned after the World's Fair building. The grounds around the present Crystal Palace are in area about 200 acres, and are beautifully laid out. This palace was opened by Queen Victoria, 10 June 1854. The name of Crystal Palace was also given to a large building erected in 1853 in New York. The site was on Sixth avenue, between 40th and 42d streets. It was a favorite place for large exhibitions, but in 1858 it was destroyed by fire. The locality is now Bryant Park.

CRYSTALLINE. The term crystalline, like the term crystal, because of the fact that the external form of crystals was long regarded as the most essential character, has been and still is used with different meanings. Any product of solidification in which there is a regular orderly arrangement of the molecules is said to possess a crystalline structure whether the individuals of this product are bounded by planes at characteristic angles or not, and such a substance is said to be crystalline as opposed to amorphous. "Granite mountains are mountains of crystals, each particle being crystalline in nature and structure." But some authorities use the term to imply an imperfect grade of crystallization especially applicable to aggregations in which the individuals while possessing perfectly the regular internal structure show no regular external form. While this is of some convenience in descriptions of such material as marble, no sharp distinction can be drawn.

CRYSTALLO-CHEMICAL ANALYSIS. Professor von Federow published in the *Zeitschrift f. Krystallographie* (38, 321–490; 50, 513–575) a method by which it is claimed if a few measurable crystals of any one of the over 10,000 recorded substances be subjected to a short, goniometrical measurement on the two-circle goniometer, occupying at most two or three hours and possibly only a few minutes, a reference to the tables will identify the substance of which the crystal is composed. To test this out samples were sent of many well-crystallized substances, some of which had only been investigated previously by one authority and in every one of these cases the substance, often an organic compound of considerable complexity, was identified.

While the fact that each chemical compound, unless isometric, possesses its own characteristic series of angles is well established, the orientation or setting up of the crystals has hitherto been to a great extent arbitrary; for instance, in an orthorhombic crystal any one of three set ups could be chosen and in the monoclinic and triclinic any number are possible. To understand von Federow's method requires a study of his theory of "parallelohedral" structure. The work involves the determining of a "correct setting" based upon the crystal structure, as determined chiefly by graphic methods, on the assumption that the most densely packed planes of the space lattice correspond to the best developed crystal faces.

Thereafter the task is to measure five or fewer characteristic angles and compare these with von Federow's tabulation for over 10,000 substances, the angles for a triclinic crystal being, for instance, 1, between two prism faces; 2 and 3, between basal pinacoid and prism faces; 4, between basal pinacoid and pyramid; 5, between pyramid face and one of prism faces. The entire tables are unpublished as yet.

CRYSTALLOGRAPHY. Crystallography is broadly divided into "geometrical or morphological crystallography," "physical crystallography» and «chemical crystallography.» In a narrower sense and as a natural result of the fact that the geometrical relations were first studied the term crystallography is restricted to a study of the relations between the bounding faces of crystals and in that sense it is used here, separate articles being devoted to the other divisions.

The tasks in consideration of crystal form in elementary work are determinations of «system,» recognition of type symbols, approximate angle measurements and interpretation of crystal descriptions, and in more advanced work are exact measurements of angles, projection and delineation, determination of indices and elements and calculation of theoretical angles from elements and indices.

As developed in the article on CRYSTALS (q.v.) the individual solids which result from the solidification of a chemical element or compound possess a regular internal structure but may be completely bounded by plane surfaces or partially bounded by plane surfaces or lack all plane boundaries.

These planes are not at haphazard positions with respect to each other, but at positions dependent upon the regular internal structure and are found to obey certain laws.

Law of Constancy of Interfacial Angles.—*In all crystals of the same substance the angles between corresponding faces are constant.* A corollary to this law is that aside from the crystals of the isometric system the crystals of each chemical substance *have a separate and definite set of angles.*

The Law of Symmetry.— Different crystals of the same substance often show unequal numbers of faces, different angles and notably different shapes, but there is in practically every crystal some repetition or recurrence of equal angles or similarly grouped faces, although such faces often are unequally distant from the centre, unequal in size and different in shape, and are comparatively rarely equal. Crystals may be regarded as possessing grades of symmetry in the sense of *symmetry of direction* with repetition of equal angles and crystals obey the law that *all crystals of any one substance are of the same grade of symmetry.*

The Law of Simple Mathematical Ratio.— If the bounding planes or faces of crystals are defined in position by referring them to co-ordinate axes after the manner of analytical geometry, the axes being chosen by rules later stated, a simple and very important relation is found to exist between all true crystal faces of crystals of any one substance which may be expressed as follows:

If the relative intercepts of all the faces are reduced so that the same term in each is unity then in all crystals of the same chemical substance, if the intercepts of any face are divided, term by term, by the corresponding intercepts of any other face, the quotients will be simple numbers or simple fractions or infinity.

ELEMENTARY DETERMINATION OF SYSTEM, TYPE SYMBOLS AND APPROXIMATE ANGLES.

Finding the System of a Crystal.— The following rules quickly determine the «system» of a crystal, without the need of a complete determination of symmetry or any consideration of «crystal» axes.

Approximate measurements are usually needed.

Essential Condition	*System*
More than one axis of three-fold symmetry.	Isometric.
One axis of four-fold symmetry, or composite symmetry and one only.	Tetragonal.
One axis of three-fold symmetry, and one only.	Hexagonal. Rhombohedral division.
One axis of six-fold symmetry.	Hexagonal division.
More than one axis of two-fold symmetry but no axis of higher symmetry (or one axis and two planes of symmetry).	Orthorhombic.
One axis of two-fold symmetry only, or one plane of symmetry only or both.	Monoclinic.
Without axes or plane of symmetry.	Triclinic.

An axis of symmetry in a crystal is a direction rather than a line through specific points. If the entire crystal is revolved (or assumed to revolve) about this direction there must be one or more repetitions, that is, positions at which all the faces are parallel to the previous positions of other faces.

According to the number of repetitions during a complete revolution the axis is known as two-fold, three-fold, four-fold or six-fold. No other varieties exist.

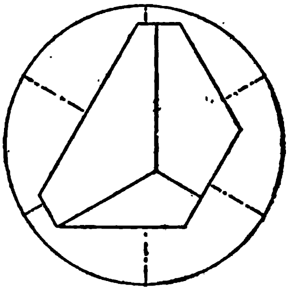


FIG. 1.

In Fig. 1 there is an axis of three-fold geometric symmetry *perpendicular to the plane of the page and through the centre of the drawing,* and in Fig. 2 a similarly placed four-fold axis.

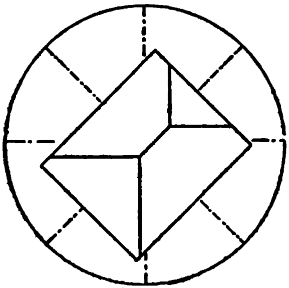


FIG. 2.

A plane of symmetry holds a definite angular relation to a crystal rather than a fixed position *in* the crystal, and with respect to it the crystal faces are in pairs, the angle between each pair being bisected by the plane of symmetry. Thus, in the crystals shown in Figs. 1 and 2 there are planes of symmetry *parallel* to each of the dot and dash lines and each perpendicular to the plane of the paper.

The system may be also determined from the relations between co-ordinate axes chosen in the following order:

First, axes of symmetry.

Second, lines perpendicular to planes of symmetry.

Third, lines *in* a plane of symmetry parallel to edges or faces.

Fourth, lines parallel or equally inclined to several faces of the crystal.

The six systems may then be defined in terms of axes, each including all crystals which are, by the given rules, referred to a particular set of axes:

The Triclinic System.— Three non-interchangeable axes at oblique angles to each other.

The Monoclinic System.— Three non-interchangeable axes, two of which are oblique to each other, the third is at right angles to the other two.

The Orthorhombic System.— Three axes at right angles but not interchangeable.

The Tetragonal System.— Three axes at right angles, of which two are interchangeable.

The Hexagonal System.— Four axes, three of which lie in one plane at 60 degrees to each other and are interchangeable, the fourth is at right angles to the other three.

The Isometric System.—Three interchangeable axes at right angles to each other.

Crystal Faces and Their Symbols.— The position in space of any crystal face, CDE, Fig. 3) is absolutely determined if the numerical values of its intercepts, OA, OB and OC, on the chosen axes are known, and if these are stated as relative distances, for instance,

$$OA : OB : OC = 0.7 : 1 : 1.46,$$

these intercepts are independent of the *absolute* position of the face and represent any face parallel to it, that is, any face in the same angular position.

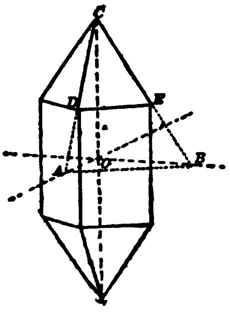


FIG. 3.

The relative intercepts for any face are simple numbers only in the case of isometric crystals but, as stated previously, there is a simple relation between the intercepts of different faces. The symbols which are used are therefore not the relative intercepts themselves but simpler expressions from which these intercepts may be derived, and a crystal description states usually the relative intercepts of some chosen face, hereafter spoken of as *parameters*, and expresses the other faces by simpler symbols; for instance, the Miller indices or the Weiss coefficients.

The Miller indices of any face are *those numbers which divided term by term into the parameters give as quotients the intercepts of the face,* and the Weiss coefficients of any face are *those numbers which multiplied term by term into the parameters give as products the intercepts of the face.* The common bounding faces almost without exception have *very* simple indices or coefficients, usually 0, 1, 2, 3 or 4. Somewhat larger numbers result for the smaller and less common faces.

The Seven Type Faces and Type Symbols in any Symmetry Class. In each symmetry class there are seven typically different positions in which a crystal face may occur with respect to the chosen crystallographic axes. These positions may be expressed in the Miller indices and the Weiss coefficients by letters, usually *h, k* and *l* in the Miller and *m* and *n* in the Weiss.

Since the numerical values are not needed the determination is merely by parallelism or non-parallelism, equality or inequality. These type symbols may be determined as follows in models and large crystals: Place a straight edge or pencil in contact with a face and, keeping it in contact, turn the straight edge until its relation to each axis has been noted.

If the straight edge *while in contact with the face* can be turned into a position parallel to the axis, the face is parallel to the axis, the corresponding Miller index is 0 and the corresponding Weiss coefficient is ∞.

If two intercepts of the face are equal, the corresponding indices (or coefficients) are expressed by the same letter.

If all intercepts are unlike all three letters are used, the order depending upon the convention used in the symmetry class.

Experience proves that well-developed faces upon crystals of the same substance occur at particular angles dependent upon the structure and that these angles yield intercepts conforming to the law of simple mathematical ratio.

Crystal "Forms" or Groups of Equivalent Faces.— The word "form" is used in crystallography with a special meaning. A form may be one face or two faces or as many as 48 faces and is not necessarily a closed form. The faces of a "form" always make the same angles with the crystallographic axes. Their symbols are therefore variants of one symbol. They are sometimes closely alike in size and shape and usually they have similar markings and lustre. The assemblage of these faces, that is, the form, must satisfy the symmetry of the crystal.

Form symbols are not mathematical expressions for the form but for some one face of the form. In the Miller indices, for instance, {121} signifies a form to which the face (121) belongs, { } conventionally being reserved for form, ( ) for faces.

A crystal may be bounded entirely by faces of one form. More frequently the bounding faces belong to two or more different forms.

The Classes of Symmetry and the Crystal Systems.— As discussed in the article on CRYSTALS, solids bounded by planes so arranged as to conform to the law of simple mathematical ratio are limited to 32 types or classes. All crystals of any one substance are limited to one class.

These classes are conveniently grouped in the older divisions called systems, each of which consists of the crystals of these classes which can be referred to a similar arrangement of co-ordinate axes.

Thirty-one of the classes have known examples. In one class in the hexagonal system no example has yet been found. Nearly all the important minerals crystallize in 10 or 11 of the 32 classes.

The determination of symmetry elements by geometric relations alone is not conclusive. The symmetry is really that of the internal structure and hence manifests itself also in the physical characters, often thereby proving a lower grade of symmetry than evidenced by shape alone.

Triclinic System (Two Classes).— Referred to three axes oblique to each other and not interchangeable.

1. *Unsymmetrical Class.*— Each form a single face. Example: Calcium thiosulphate, $CaS_2O_3.6H_2O$.

2. *Pinacoidal Class.*— Symmetrical to the

centre only. Each form consists of two parallel faces. Example: Axinite. Fig. 4.

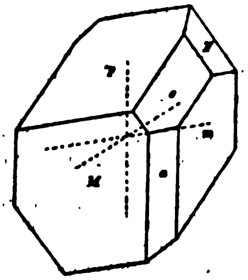


FIG. 4.

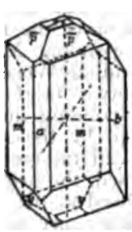


FIG. 5.

Monoclinic System (Three Classes).— Referred to three non-interchangeable axes, two oblique (at angle β) to each other, the third at right angles to the other two.

3. *Sphenoidal class.*— With one axis of two-fold symmetry. Example: Tartaric acid, $H_2C_4H_4O_6$.

4. *Domal Class.*— With one plane of symmetry. Example: Clinohedrite, $H_2ZnCaSiO_4$.

5. *Prismatic Class.*— With one plane and one two-fold axis at right angles to the plane. Example: Pyroxene, $RSiO_3$.

The crystallographic description of a monoclinic crystal would include the parameters, the angle between the oblique axes and the symbols, for instance, the pyroxene crystal, Fig. 5, $\breve{a} : \bar{b} : \acute{c} = 1.092 : 1 : 0.589$; $\beta = 74° 10' 9''$.

Occurring forms show the three pinacoids, *a*, *b* and *c*, the unit prism *m* {110}, the negative unit hemi-pyramid $\bar{p}$ {111} and the positive hemi-pyramid *v* {221}

Orthorhombic System. (Three Classes).— Referred to three non-interchangeable axes at right angles to each other.

6. *Class of the Rhombic Bisphenoid.*—With three axes of two-fold symmetry at 90 degrees to each other. Example: Epsomite, $MgSO_4.7H_2O$.

7. *Hemimorphic Class.*—With two planes of symmetry at 90 degrees to each other, intersecting in an axis of two-fold symmetry. Example: Calamine, $Zn(OH)_2SiO_3$.

8. *Bipyramidal Class.*— Three planes at right angles to each other, their intersections being axes of two-fold symmetry. Example: Chrysoberyl, $BeAl_2O_4$.

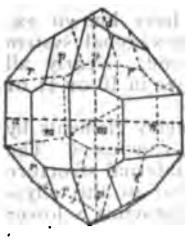


FIG. 6.

The description of an orthorhombic crystal would include parameters, and indices of occurring forms. For instance, the crystal of chrysoberyl, Fig. 6.

Parameters $\breve{a} : \bar{b} : \acute{c} = 0.470 : 1 : 0.580$. Forms: unit pyramid *p*. {111}, unit prism *m* {110}, prism *n* {120}, pyramid *r* {121}, brachydome *d* {011}

Tetragonal System (Seven Classes).— Referred to three axes at right angles, two of which are interchangeable with each other. The intercepts of a face upon the interchangeable axes are always simple or infinite multiples of each other.

9. *Bisphenoidal Class.*— One two-fold axis. Example: $Ca_2Al_2SiO_7$.

10. *Pyramidal Class.*— One four-fold axis. Example: Wulfenite, Pb MoO_4.

11. *Scalenohedral Class.*—Three two-fold axes at right angles. Two planes through one axis and midway between the others. Example: Chalcopyrite, $CuFeS_2$.

12. *Trapezohedral Class.*— One four-fold axis at 90 degrees to four two-fold axes. Example: $NiSO_4.6H_2O$.

13. *Class of Tetragonal Bipyramid.*— One four-fold axis and one plane perpendicular to it. Example: Scheelite, $CaWO_4$.

14. *Class of the Ditetragenal Pyramid.*— Four planes intersecting in a four-fold axes. Example: Iodosuccinimid, $C_4H_4O_2NI$.

15. *Class of the Ditetragonal Bipyramid.*— One four-fold axis, four planes intersecting in it, and one plane and four axes perpendicular to it. Example: Rutile, TiO_2, Fig. 7, shows a rutile crystal, $\acute{c} = 0.644$, with unit first and second order pyramids *p* {111} and *d* {101}, with first and second order prisms *m* {110} and *a* {100}

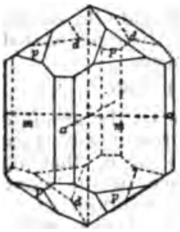


FIG. 7.

The Hexagonal System. Rhombohedral Divison (Seven Classes).— Referred to four axes, one a three-fold symmetry axis, the others interchangeable at right angles thereto and at 60 degrees to each other.

16. *Class of Trigonal Pyramid.*—With the three-fold axis. Example: Sodium periodate, $NaIO_4$. $3H_2O$.

17. *Rhombohedral Class.*—With three-fold axis and centre. Example: Phenacite, Be_2SiO_4.

18. *Class of Trigonal Trapezohedron.*—With three-fold axis and three two-fold axes of symmetry at 90 degrees thereto. Example: Quartz.

19. *Class of Trigonal Bipyramid.*—With three-fold axis and one plane of symmetry at 90 degrees thereto. No example known.

20. *Class of the Ditrigonal Pyramid.*—With three-fold axis and three planes through this at 60 degrees to each other. Example: Tourmaline, $R_{18}B_2(SiO_5)_4$.

21. *Scalenohedral Class.*—With three-fold axis and three planes intersecting at 60 degrees to each other, and three two-fold axes diagonal to the planes. Example: Calcite, $CaCO_3$.

The most important class in the hexagonal system.

Fig 8 is a crystal of calcite, $c = 0.854$ showing the rhombohedron $e \{10\bar{1}2\}$, and the first order prism $\{10\bar{1}0\}$.

22. *Class of Ditrigonal Pyramid.* The three-fold axis, three planes at 60 degrees and one at 90 degrees to the three. Example: Benitoite, $BaTiSi_3O_9$.

Hexagonal System. Hexagonal Division (Five Classes).— Referred to four axes, one a six-fold symmetry axis, the other three interchangeable, at right angles thereto and at 60 degrees to each other and interchangeable.

23. *Class of Hexagonal Pyramid.*— With the

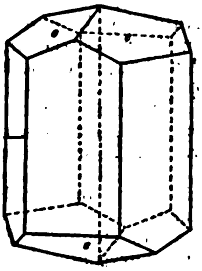
six-fold axis only. Example: Nephelite, $NaAlSiO_4$ (nearly).

24. *Class of Hexagonal Trapezohedron.*— With six-fold axis and six two-fold axes of symmetry at 90 degrees thereto. Example: $Ba(SbO)_2(C_4H_4O_6)_2.KNO_3$.

25. *Class of Hexagonal Bipyramid.*— With six-fold axis and a plane of symmetry at 90 degrees thereto. Example: Apatite, $Ca_5Cl.F(PO_4)_3$.

26. *Class of Dihexagonal Pyramid.*— With six-fold axis and six planes of symmetry at 30 degrees to each other intersecting therein. Example: Greenockite, CdS.

27. *Class of Dihexagonal Bipyramid.*— With six-fold axis, six planes of symmetry at 30 degrees to each other intersecting therein, and one plane and six axes perpendicular thereto. Example: Beryl, $Be_3Al_2(SiO_3)_6$. Fig. 9 shows a beryl crystal with $\dot{c} = 0.499$ and the forms prism of first order m, $\{10\bar{1}0\}$, basal pinacoid $c\{0001\}$ pyramid of first order $p\{10\bar{1}1\}$ and pyramid of second order $e\{11\bar{2}1\}$



IG. 8.

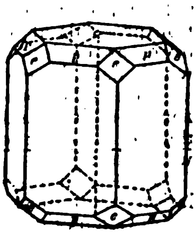


FIG. 9.

Isometric System. (Five Classes).— Referred to three interchangeable axes at right angles to each other. The symmetry axes are either three cubic at right angles to cube faces, four octahedral, through opposite corners of a cube, or six dodecahedral, through centres of opposite edges of a cube.

28. *Class of Tetartoid.*— With the three cubic and four octahedral axes. Example: Barium nitrate, $Ba(NO_3)_2$.

29. *Class of Gyroid.*— With the three cubic, four octahedral and six dodecahedral axes. Example: Sylvite, KCl.

30. *Class of Diploid.*— With the three cubic and four octahedral axes and three (cubic) planes. Example: Pyrite, FeS_2.

31. *Hextetrahedral Class.*— With the three cubic and four octahedral axes and six planes (dodecahedral). Example: Tetrahedrite, $Cu_8Sb_2S_7$.

32. *Hexoctahedral Class.*— With all the axes and planes of the preceding, that is, three cubic, four octahedral and six dodecahedral axes and with three cubic and six dodecahedral planes. Example: Garnet, $R_3'' R_2''' (SiO_4)_3$.

Typical crystals of pyrite tetrahedrite and garnet are shown in Figs. 10, 11, 12, in which the forms are the cube a $\{100\}$, octahedron p $\{111\}$, dodecahedron d $\{110\}$, trapezohedron n $\{211\}$, pyritohedron e $\{210\}$, deltohedron r $\{221\}$, and tristetrahedron o $\{311\}$.

The Grouping of Crystals.— Crystals are frequently grouped, sometimes in parallel position, when many little crystals may unite to one large crystal, sometimes in twin positions as if one individual had been revolved 180 degrees with respect to the other about some «twin» axis, or as if two individuals had developed symmetrically with reference to a so-called twin plane. The twin-plane is always a possible crystal face, usually with simple indices, and the twin-axis is a crystal edge or is normal to a possible crystal face. The twinning law is defined by the twin-plane or twin-axis.

Frequently there is a repetition of the twinning, a third individual occurring reversed upon the second, a fourth upon the third, and this may result in many thin lamellæ, «polysynthetic» twinning, or in circular forms which often suggest a higher symmetry. Twins may usually be recognized by the presence of reëntrant angles or by striations as in the plagioclases.

Even when not grouped in parallel or symmetrical positions, there may be some degree of regularity as parallel or radiating and whether showing plane faces or not the individuals may be distinguished *as to their shape* by such terms as: columnar, banded, fibrous, foliated, lamellar and granular.

Crystal Habit.— The prevailing shape or «habit» of the crystals of a substance is fairly constant, under one set of conditions, but with different conditions at formation the «habit» usually is different. The reasons are not understood. Terms used to express habit are prismatic, or tabular, conveying a *general* idea of the shape or more specifically cubic, octahedral, pyramidal, implying that the usually dominant form is the cube, octahedron or pyramid respectively.

Imperfections of Crystals.— The perfect crystal completely bounded by smooth plane faces is difficult to find. Unless formed while in a non-hindering medium they will not be completely bounded and the faces are often marked by parallel «grooves» called «striations» or less frequently by etched figures and secondary

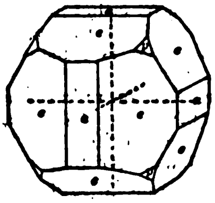


FIG. 10.

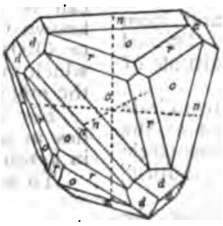


FIG. 11.

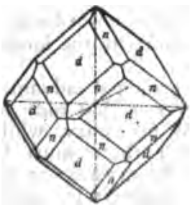


FIG. 12.

growth, or they may be replaced wholly or in part by so-called vicinal planes which are faces of flattened pyramids nearly coincident with the true face. Occasionally the faces are curved from strain or partial resolution or the union of many smaller crystals and lack of homogeneity may be indicated by various phenomena, such as opalescence, zonal structure, «phantoms,» variation in color or visible solid liquid or gaseous inclusions.

The Measurement of Crystal Angles.— In the simpler tasks of determining symmetry, system and type symbols, approximate measurements within one or two degrees with a contact goniometer often suffice. This instrument in its better forms consists of a brass protractor with detachable arms which can be slid upon a pivot until of the most convenient length for the particular crystal.

In measuring the arms are detached, set at an angle a little less than the angle to be measured, clamped loosely and one of the arms placed in perfect contact with one crystal face. The other arm then nearly touches the second face and, while holding between the eye and the light, is brought into perfect parallelism with the second face by a gentle pressure with the forefinger.

The arms are then replaced on the arc and the angle is read.

For the more exact work of determining parameters and angles and the numerical values of indices some form of «reflection» goniometer is almost universally used by which the angles between smooth bright faces are measured to minutes or closer. The goniometers may be one, two or three circle and may vary considerably in details of construction. In the one-circle goniometer the crystal is attached by wax to a carrier and adjusted so that the edge between the two faces coincides with the axis about which the crystal is free to turn. Light is directed through a so-called collimator fixed in position at right angles to the axis of rotation and falling upon any face parallel to this axis it is reflected in the same plane and for some position of rotation is reflected to the reading telescope. Further rotation brings a second face to the position of reflection and the difference between the two readings is the supplement of the angle between the two faces.

In the two-circle goniometer there are the same crystal carrier, collimator and reading telescope but the circle which bears the crystal carrier in turn revolves about an axis perpendicular to its own. The crystal is mounted with some chosen face parallel to the circle which bears the carrier and this face for all positions of this circle and one position of the other circle sends a reflection to the reading telescope. By rotation of the two circles reflections are obtained for each face and from the readings co-ordinate angles are obtained corresponding to the longitude and colatitude of a place.

The principal advantage of the two-circle goniometer is that only one adjustment of the crystal is necessary, while with the one-circle goniometer there must be a separate adjustment of the crystal for each zone.

The three-circle goniometer combines the advantages of the one-circle and the two-circle in that the zones are obtained by two of the circles and measured on the third without further adjustments.

The Projection of Crystals.— The faces and zones of a crystal are most conveniently studied in some form of projection in which each face is represented by a point (or line) in a position determined by the measured angles. Such projections may be regarded as maps made to scale, from which both graphically and by calculation all the relations of symmetry, indices, constants and angles may be determined, the methods being at once simple and accurate.

The most used projections are the stereographic and the gnomonic, both of which assume that the crystal is surrounded by a sphere, the centres of the sphere and the crystal coinciding, and that radii are drawn from the centre *perpendicularly to each face* of the crystal, piercing the surface of the sphere in definite points or poles. The «projections» are projections of the imaginary sphere and its face poles upon planes, the stereographic being a projection upon the equator by lines drawn from each face pole to the south pole, while the gnomonic is a projection upon a plane tangent at the north pole by prolonged radii. Naturally the construction proceeds at once from the measured angles to the projection by simple and accurate methods which have been developed.

After the projection has been made, the zones obtained and the elemental faces assumed, the method of procedure varies. A simple order would be:

1. Determining graphically and by zonal relations the indices of all faces.
2. Calculation of the axial elements from the relations between the measured angles.
3. Calculation of the theoretical angles corresponding to the determined indices and elements.

These can only be glanced at.

Zonal and Graphic Determination of Indices.— All edges between faces of a zone are parallel and there must be some radius in the surrounding sphere parallel to them. There must also be three indices corresponding to the point at which it cuts the sphere. These are called zone indices and may be derived from the indices of any two faces of the zone by cross multiplication. For instance, if a zone contains the two faces (133) and (311), the values of the zone indices [*uvw*] are obtained as follows:

$$\begin{array}{c|cccc|c} 1 & 3 & 3 & 1 & 3 & 3 \\ & & \times & \times & \times & \\ 3 & 1 & 1 & 3 & 1 & 1 \end{array} \qquad \begin{array}{l} u=3-3=0 \\ v=9-1=8 \text{ or } [uvw]=[08\bar{8}]=[01\bar{1}] \\ w=1-9=\bar{8} \end{array}$$

The indices of a face in two zones result from a similar cross multiplication of the two sets of zone indices, and very rapid calculations can be made, more especially if one of the known faces in each zone is either (001), (010) or (100), for then the ratio of the two indices, which are zero for this face, is constant for all the other faces of the zone.

For instance (Fig. 13) an unknown face *h* lies in a zone with (010) and (305) and also in a zone with (100) and (111).

To substitute in *hkl* we have therefore

From first zone, 3, –, 5.
From second zone, –, 1, 1,

Remembering these are ratios and combining by inspection the indices of the face *h* must be (355). Similarly the indices of the face *b* must be (335) and of *k* must be (011) and *e* (131),

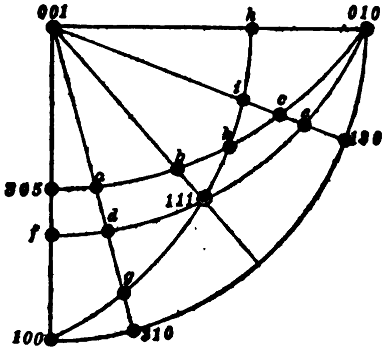


FIG. 13.

It will usually happen that only the indices of a few faces can be obtained *directly* by zonal equations, certain factors being lacking, but many graphical devices exist by which a fresh start can be made and zonal solutions again obtained.

Calculations of Axial Elements and Theoretical Angles.— The formulæ of spherical trigonometry and special formulæ in terms of the determined indices and measured interfacial angles are most used. For instance, in the Orthorhombic system for the ratio $\breve{a} : \bar{b} : \acute{c}$, if $\bar{b}$ is taken as unity the simplest formulæ are:

$$\breve{a} = \frac{h}{k} \tan (100) \wedge (hk0); \quad c = \frac{l}{k} \tan (001) \wedge (okl).$$

Similar but somewhat more complex formulæ exist for the (*hkl*) angles.

Similarly in the monoclinic system for the values of β and of $\grave{a} : \bar{b} : \acute{c}$, $\bar{b}$ being taken as unity

$$\beta = (100) \wedge (001),$$

$$\cos \beta = \frac{\cos (001) \cdot (hk0)}{\cos (010)\ (hk0)},$$

Simple formulæ for $\grave{a}$ and $\acute{c}$ are

$$\breve{a} = \frac{h}{k} \, \frac{\cot (010) \wedge (hk0)}{\sin \beta},$$

$$\acute{c} = \frac{l}{k} \, \frac{\tan (001) \wedge (0kl)}{\sin \beta}.$$

Crystal Drawing.— The usual crystal drawing is a "clinographic" projection, such as Figs. 4 to 12, in which the crystal is projected upon a vertical plane by parallel rays oblique to the plane of projection. The eye is assumed at an infinite distance a little to the right and above the centre of the crystal.

The figures obtained in this way have an appearance of solidity, all parallel edges are parallel and all points in a given line remain the proper *proportionate* distances apart.

The work consists chiefly of two stages, first finding the projection of the crystal axes cut off at the parameter lengths; second, finding the direction of the projection of any edges from the indices of the intersecting planes.

The dominant forms are drawn and then the minor modifying planes, either in ideal symmetry or so as to indicate the relative development of faces and forms. The details cannot be given here. See CHEMICAL CRYSTALLOGRAPHY; CRYSTAL; CRYSTALLO-CHEMICAL ANALYSIS; GEOMETRICAL CRYSTALLOGRAPHY; PHYSICAL CRYSTALLOGRAPHY; MINERALOGY.

Bibliography.— Standard textbooks in crystallography usually contain good presentations of Geometrical Crystallography. Some of the special treatises are Bayley, W. S., 'Elementary Crystallography' (New York 1910); Hilton, H., 'Mathematical Crystallography' (Oxford 1903); Lewis, W. J. A., 'A Treatise on Crystallography' (Cambridge, England, 1899); Linck, G., 'Grundriss der Kristallographie' (3d ed., Jena 1913); Reeks, M., 'Hints for Crystal Drawing' (London 1908); Tutton, A. E. H., 'Crystallography and Practical Crystal Measurement' (London 1911); Viola, C. M., 'Grundzüge der Kristallographie' (Leipzig 1906); Walker, T. L., 'Crystallography' (New York 1914).

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CSABA, chŏb'ŏ, or **BÉKES-CSABA** (ba'-kăsh), Hungary, a market town near White Körös, with which it is connected by canal, in the county of Bekes, about 105 miles southeast of Budapest. The trade is chiefly in grain, wine, hemp, flour and cattle. The Lutheran religion predominates. Pop. 42,599.

CSOMA DE KOROS, chō'mō dĕ kĕ'rish, **Alexander** (Hungarian *Sandor*), Transylvanian traveler and philologist: b. Körös, 4 April 1784; d. Darjeeling, India, 11 April 1842. He was educated first at the college of Nagy-Enyed and subsequently at Göttingen, where he specialized in Oriental languages. He was in early life seized with the desire to investigate the origin of the Magyar race. He went, in 1820, to the East for that purpose. He visited Egypt and Persia and spent several years in a Buddhist monastery in Tibet, diligently studying the Tibetan language and literature, imagining he recognized resemblances between the Tibetan and Magyar. He next lived some years in Calcutta, studying Sanskrit, and compiled his 'Dictionary of Tibetan and English,' and a 'Grammar of Tibetan.' He catalogued the Tibetan books and wrote a number of articles in the *Asiatic Researches.* Once more he set out on his old-time search to find the home of the early Magyars and bent his way toward the western confines of China, but died on the way. Consult Duka, Th., 'Life and works of A. C. de Körös' (London 1885).

CSONGRAD, chŏn'grăd, Hungary, a market town, capital of a county of the same name, at the junction of the Körös with the Theiss, 72 miles southeast of Budapest. The surrounding country is very flat and has excellent pastures. The chief occupations are cattle-raising, agriculture, wine-making and fishing. Pop. 28,310, mostly Magyars.

CTENOID, tĕn'oid (Gr. "comb-like"), applied to the scales of fishes when jagged or pectinated on the edge like the teeth of a comb, as in the perch, flounder and turbot.

CTENOPHORA, tĕn-ŏ'fŏr-ă, a phylum of animals, sometimes grouped under the Cœlenterata (q.v.) but distinguished from them by the absence of stinging cells and the presence of a third germinal layer. They also possess comb-like bands of cilia which serve them for locomotion, instead of the umbrella and tentacles of the cœlentarates. In almost all cases two long and contractile tentacles are present, establishing the double bilateral symmetry which is characteristic of the group. There is a sense-organ of equilibrium at the end of the body opposite the mouth. The digestive tube has other openings to the exterior than the mouth, but these do not appear to function as an anus. The body is transparent and gelatinous and is usually pear-shaped. The Venus' girdle belongs to the group which appears to be remotely applied to the Turbellaria.

CTESIAS, tē'shĭ-as, Greek historian and physician: fl. about 400 B.C. In 415 he was captured by the Persians and lived for 17 years at the court of Persia, where he wrote his ‘History of Persia’ with the view of correcting the errors prevalent among his countrymen about that country. According to Diodorus his work is derived from the official history of the Persians, written according to the law of the country. His work was written in the Ionic dialect and contained 23 books. Of this work all that remains is an abridgment in Photius and the fragments contained in Diodorus and other historians. His writings are particularly valued for the light they throw on the history of Eastern nations. An edition of Ctesias, with an introductory essay on his life and writings, was published by Bähr (1824), and by C. Müller in an appendix to Dindorf, ‘Herodotus’ (Paris 1844). Consult Gilmore's edition of the fragments of the ‘Persika,’ with notes and introduction (1888); Blum, ‘Herodotus and Ctesias’ (Heidelberg 1836), and Wachsmuth, ‘Einleitung in das Studium der alten Geschichte’ (Leipzig 1895).

CTESIBIUS, tē-sĭb'ĭ-us, Greek mechanician. He flourished under Ptolemy Philadelphus and Euergetes, at Alexandria, about 250 B.C., and was famous for his inventions in mechanics. We owe to him and his pupil, Hero Alexandrinus, the pump, the bent siphon and also the discovery of the elastic force of air and its application as a motive power. His work on hydraulic machines is lost.

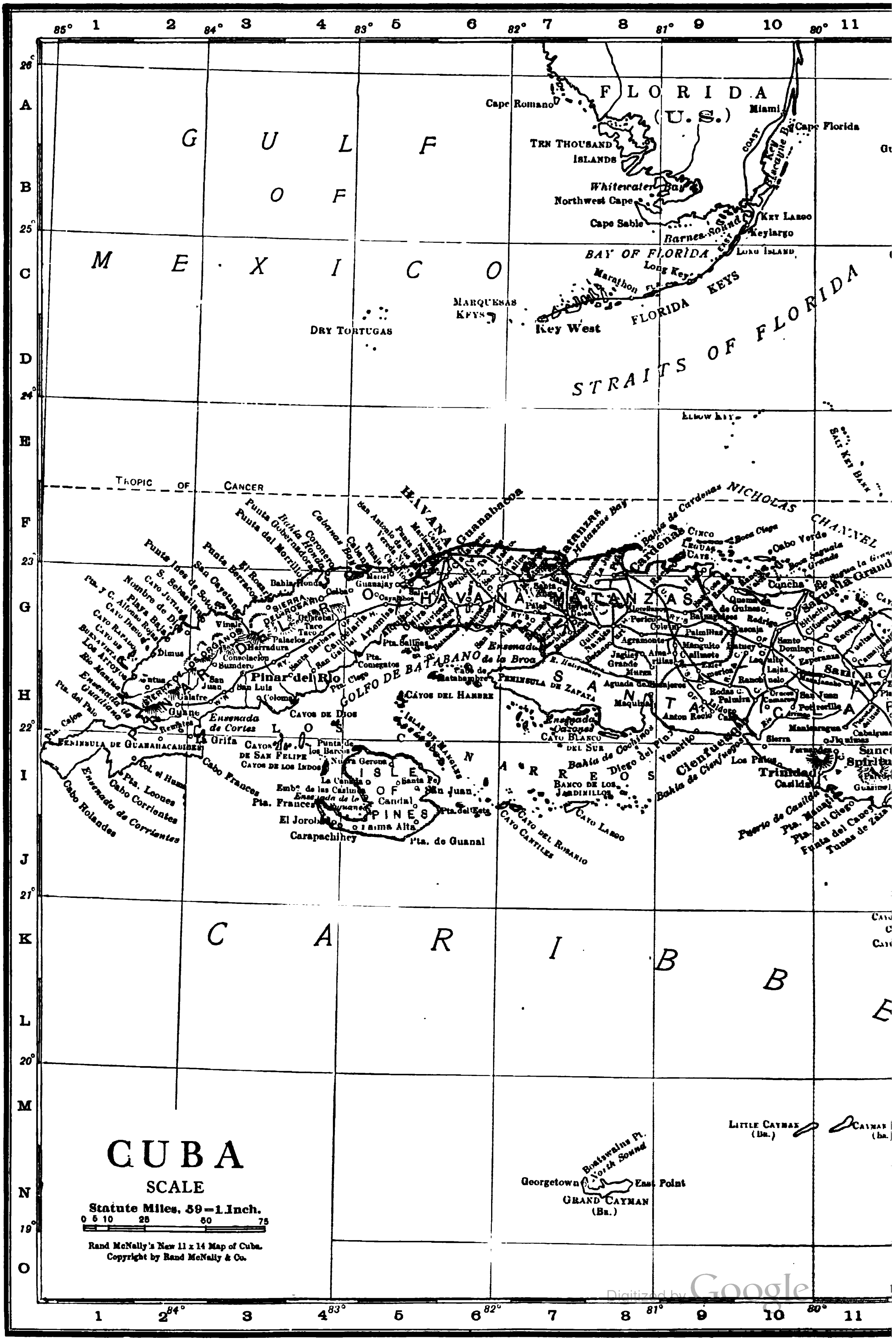
CTESIPHON, tĕs'ĭ'fŏn, or **TAK-I-KESRA**, Asia, a city of Babylonia, on the east bank of the Tigris and opposite Seleucia, the common winter residence of the Parthian kings, and finally the capital of the Parthian kingdom. It was conquered by the Romans in 115 A.D. and destroyed by the Arabs under Omar in 637. Its ruins still attest its former magnificence. The two places Ctesiphon and Seleucia are known as tthe Arab town, El-Medaīn.

CUAJINIQUILAPA, kwā-Hē-nē-kē lā'pá, Guatemala, the chief town of the eastern department of Santa Rosa, 35 miles southeast of the city of Guatemala. Its altitude above the level of the sea is 3,254 feet. Pop. 3,062.

CUAUTLA MORELOS, kwä-oot'la, dā mō-rā'lōs, Mexico, the chief town of the district of Morelos, in the state of Morelos. It is about 26 miles from Cuernavaca, the capital of the state and 85½ miles from the City of Mexico, with which it is connected by railway. The surrounding country is a fertile sugar-producing district. Cuautla is historically interesting because it occupies the site of an old Indian town, and, furthermore, in the war of independence the famous patriot leader José Maria Morelos y Pavón was besieged here. It is well known as a health resort on account of its hot sulphur springs. Pop. 7,000.

CUBA. An island in the West Indies, is separated from the United States by the Strait of Florida, and from Mexico by the Yucatan Channel, and commands the entrances of the Gulf of Mexico. Extending east and west from the 74th to the 85th meridian, it constitutes the most important part of the northern barrier of the Carribean Sea, and guards the Windward Passage, the natural route for commerce between the Atlantic Ocean and the “American Mediterranean,” which is equivalent to saying that it guards the route of commerce between the Atlantic and Pacific oceans, via the Isthmus of Panama. Its eastern point, Cape Maisi, lies directly south of New York city; its western point, Cape San Antonio, nearly south of Cincinnati. But the length of the island, 730 miles, is somewhat greater than that statement would indicate, for Cuba curves “like a bird's tongue,” as the Spaniards used to say, from lat. 19° 40′ N. in the province of Oriente up to lat. 23° 13′ N., the most northerly provinces being those of Matanzas and Havana. In its upward curve the coast-line attains a point that is only 96½ miles distant from Key West; thence it falls away again until but 130 miles separate it from the mainland of Mexico. Its width decreases gradually from 100 miles in the east to less than 25 near the line between the two western provinces, Pinar del Rio and Havana. Its total area, including the Isle of Pines and the *cayos* or keys (more than 1,000 islets that form an irregular border along the northern and southern coasts) is estimated at 44,164 square miles. Thus it is larger than Virginia; smaller than Pennsylvania.

Physical Features.— Nature has provided unusual facilities for making the most of Cuba's favorable situation upon a great and permanent marine highway. The coast-line is 2,000 miles long, or much more than that if we take into account all its indentations. Capacious harbors, quite evenly distributed along the north coast, are Baracoa, Nipe, Gibara, Nuevitas, Sagua la Grande, Matanzas, Havana, Cabanas and Bahia Honda; and, on the south coast, Cienfuegos, Trinidad, Manzanillo, Santiago de Cuba and Guantanamo. Besides these there are scores of fairly safe roadsteads and harbors of moderate size. Therefore no plantation on the narrow island can be very far away from some port at which supplies may be received and from which produce may be shipped. The mountains of Cuba occur in three distinct groups. In the westernmost province, Pinar del Rio, the Guaniguanico Range (Sierra de los Organos; greatest altitude, 2,532 feet), extends from Cape San Antonio to the boundary-line of Havana province, and thence continued in lower disconnected hills which give a bold outline to the northern coast of the four central provinces, it becomes the chief feature of the impressive landscapes around Sagua de Tanamo and Baracoa, far away in the east. The Guamuhaya group occupies but a limited area in the southern part of Santa Clara province, between the cities of Cienfuegos and Trinidad. Its highest summit, El Poterillo, is 2,900 feet. While the foregoing are of no great height, but owe their



CUBA

SCALE

Statute Miles, 59 = 1 Inch.

0 5 10 25 50 75

Rand McNally's New 11 x 14 Map of Cuba.

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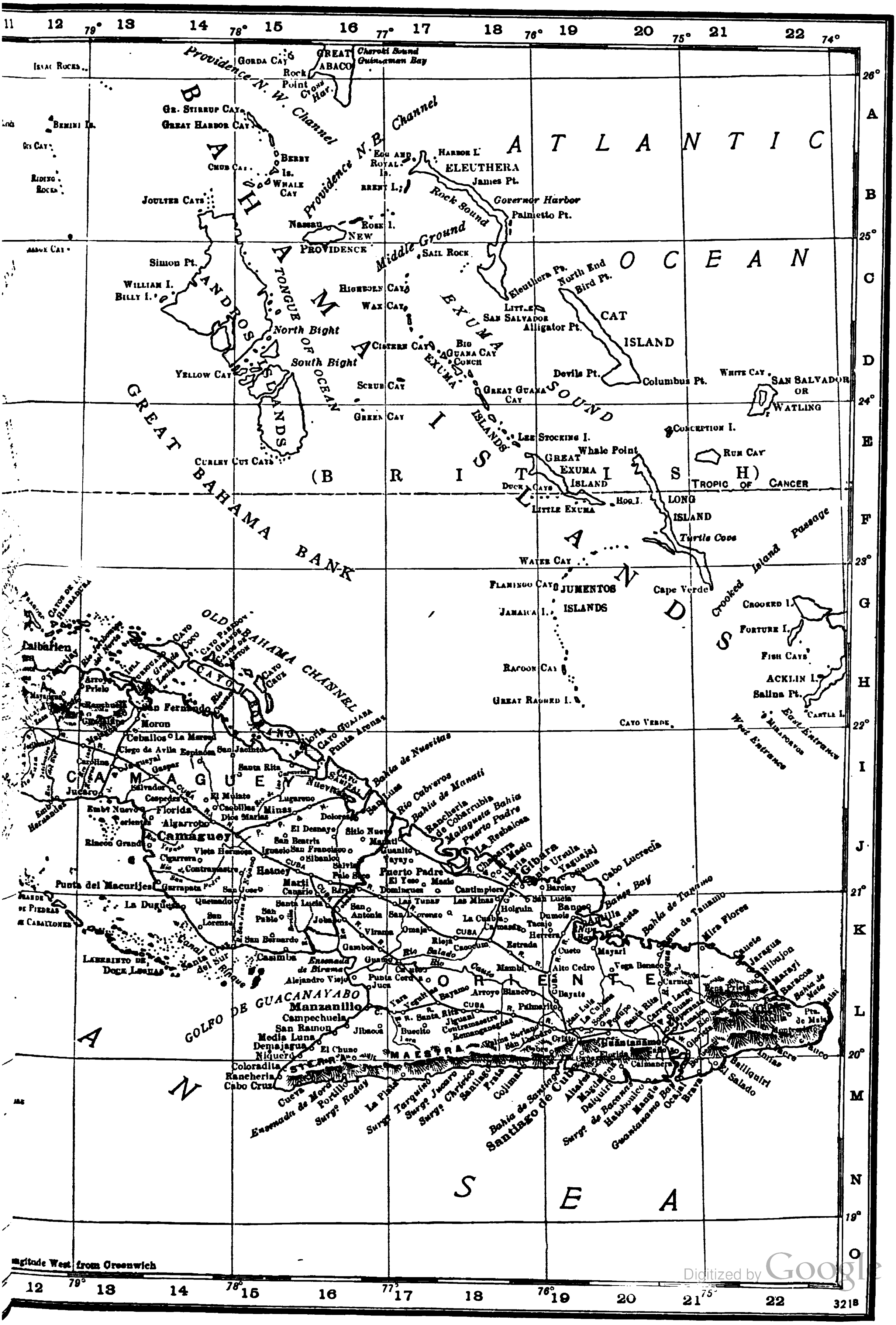

ATLANTIC OCEAN
BAHAMA ISLANDS
(BRITISH)
GREAT BAHAMA BANK
OLD BAHAMA CHANNEL
TONGUE OF OCEAN
EXUMA SOUND
Providence N. W. Channel
Providence N. E. Channel
Middle Ground
Crooked Island Passage
Gorda Cay
Great Abaco
Cherokee Sound
Rock Point
Cross Har.
Isaac Rocks
Bemini Is.
Gr. Stirrup Cay
Great Harbor Cay
Berry Is.
Chub Cay
Whale Cay
Joulter Cays
Nassau
New Providence
Rose I.
Egg and Royal Is.
Harbor I.
Eleuthera
James Pt.
Rock Sound
Governor Harbor
Palmetto Pt.
Sail Rock
Eleuthera Pt.
North End
Bird Pt.
Cat Island
Little San Salvador
Alligator Pt.
Devils Pt.
Columbus Pt.
White Cay
San Salvador or Watling
Simon Pt.
William I.
Billy I.
Andros Islands
North Bight
South Bight
Yellow Cay
Curley Cut Cays
Highborn Cay
Wax Cay
Cistern Cay
Big Guana Cay
Conch
Exuma Islands
Scrub Cay
Great Guana Cay
Green Cay
Lee Stocking I.
Great Exuma Island
Whale Point
Duck Cays
Little Exuma
Hog I.
Long Island
Turtle Cove
Tropic of Cancer
Conception I.
Rum Cay
Water Cay
Flamingo Cay
Jumentos Islands
Jamaica I.
Racoon Cay
Great Ragged I.
Cape Verde
Cayo Verde
Crooked I.
Fortune I.
Fish Cays
Acklin I.
Salina Pt.
Castle I.
Mira por vos
East Entrance
West Entrance
Caibarien
Moron
San Fernando
Ciego de Avila
Camaguey
Jucaro
Florida
Minas
Nuevitas
Puerto Padre
Gibara
Holguin
Las Tunas
Victoria de las Tunas
Bayamo
Manzanillo
Campechuela
San Ramon
Media Luna
Niquero
Cabo Cruz
Oriente
Sierra Maestra
Santiago de Cuba
Bahia de Santiago
Guantanamo
Baracoa
Cabo Lucrecia
Mayari
Jiguani
Palma Soriano
Bahia de Nipe
Golfo de Guacanayabo
Canal de Santa Cruz del Sur
Laberinto de Doce Leguas
Punta del Macurijes
Santa Cruz del Sur
Cayo Romano
Cayo Coco
Cayo Guajaba
Cayo Sabinal
Bahia de Nuevitas
Bahia de Manati
Puerto Padre
Tanamo
Cabo Maisi
Pta. de Mulas
Sagua de Tanamo
Mira Flores
Alto Cedro
Ensenada de Mora
Cuba
A N
S E A
Longitude West from Greenwich
79°
78°
77°
76°
75°
74°
26°
25°
24°
23°
22°
21°
20°
19°
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attractiveness rather to beauty or oddity of outline, the luxuriance of the foliage on their slopes, and the exquisite charm of the valleys they enclose, on the southern coast of Oriente province is a range that, in majesty, rivals and probably surpasses any mountains of the North American continent, east of the Mississippi. This is the Sierra Maestra (including the Sierra del Cobre and Macaca group). Rising precipitously above the Caribbean Sea, this cyclopean wall extends through two degrees of longitude, from Cape Cruz to the city of Santiago, in a nearly straight east and west line. The altitudes of three widely separated peaks are given as follows: The Cerro del Oro, 3,300 feet; La Gran Piedra, 5,200 feet; and Pico Tarquino, 8,600 feet. From this it will be seen that all the northern parts of the island, and the southern coast as far west as Cape Cruz, are either mountainous or at least well above sea-level. But a long stretch of coast on the Caribbean Sea, especially the southern portion of Santa Clara and Matanzas provinces, is comparatively low-lying and swampy. The great Zapata swamp is formed where the gradual southern slope reaches the Caribbean level. Beyond the limits of the Zapata is an archipelago of islets, the so-called «Gardens» or «Little Gardens» (Jardinillos), crowding the shallow waters between Cuba and the Isle of Pines.

Cuba's agricultural wealth is due to the fertility and depth of the soil that covers the pre-Tertiary sedimentary rocks forming the base of the island's structure. Above the diorites, basalts and serpentines, the granitoid rocks, the primary and secondary sandstones, limestones and conglomerates, is a great sheet of late Teritary limestone. This white sheet or crust, of remarkable thickness, was formed as a deposit of «organically derived oceanic material,» says Dr. Robert T. Hill; and he adds: «The island was reclaimed from the sea by a great mountain-making movement in late Tertiary time, succeeding the deposition of these limestones. In later epochs, Pliocene and Pleistocene, the island underwent a series of epeirogenic subsidences and elevations which affected the coastal borders, producing the wave-cut cliffs and a margin of elevated reef rock which borders the coast in many places.» About two-thirds of the entire area of Cuba is covered with soils derived from this organic limestone — soils whose colors, red and black, are not at all suggestive of their origin. In quality, in depth and in the proportion they sustain to less productive districts of the island, these calcareous soils are probably unrivaled. It is quite certain that they have no rival in any land whose situation is equally favorable for easy and cheap transportation of produce to foreign markets. A different type of soil, also valuable in agriculture, is the clay and gravel resulting from the decomposition of Tertiary igenous rocks. This occurs in parts of the provinces of Oriente, Santa Clara and Matanzas. Approximately one-half of the island has been cleared, but between 13,000,000 and 15,000,000 acres are still covered with forests. The climate also favors vegetation, for the air is moist and injurious extremes of temperature are unknown. At Havana the thermometer averages 77° F. for the year, or 82° F. in the months of July and August, and 72° F. in December and January. At Santiago the average temperature for a year is somewhat higher — about 80° F.; on the other hand, towns located in the interior at an elevation of 200 or 300 feet above sea-level have an agreeable climate, the temperature averaging not more than 74° F. Rain falls most abundantly between the end of April and the beginning of November. The largest river is the Cauto, which flows westward through Oriente province and empties into the Gulf of Guacanayabo. Many smaller streams make their way from the mountains to both the southern and northern coasts; not a few have carved out subterranean passages through the white limestone, and thus, in ages long past, caverns of remarkable beauty have been formed. Even to-day in the western provinces, a number of streams disappear from view in some underground channel long before the sea is reached.

Population and Political Divisions.— The number of inhabitants, according to the census taken in 1907, was 2,048,980. In 1913 it was given as 2,382,990; in 1916 as 2,627,536.

The area and population of the six provinces of Cuba are (1916) as follows:

PROVINCES	Area (in square miles)	Population
Havana (including Isle of Pines).....	3,174	651,266
Pinar del Rio........................	5,212	257,781
Matanzas.............................	3,260	270,513
Santa Clara..........................	8,266	569,416
Camagüey.............................	10,076	154,567
Oriente..............................	14,227	567,988
Total........................	44,215	2,471,531

Natural Resources.— In the mountainous eastern province deposits of copper, iron, manganese, mercury, zinc, silver, antimony, lead, etc., exist, and some of the mines have been worked on an extensive scale. The copper mines at Cobre, near the city of Santiago, were opened in 1524, and ranked as the greatest copper mines in the world until the deposits of this metal in the United States were developed. Iron ore of excellent quality outcrops on the slopes of the Sierra Maestra Range. Especially worthy of mention, in the province of Oriente, are the hematite and magnetite mines at Daiquiri and other points farther toward the east and north. Large deposits of silver have been found in the provinces of Camagüey, Oriente and Santa Clara, and every province contains mines of asphaltum. Cedar, mahogany, pine, lignum-vitæ, ebony, rosewood, logwood, and other dyewoods, are valuable products of the forests for export. For the use of the Cubans themselves the royal palm stands unrivaled. There are many less familiar trees, not only the characteristic flora of the other West Indian islands of Central America and Florida, but plant-forms that have developed quite distinctive characteristics in the depths of these forests whose borders have only been touched by the inexpert native lumberman. More than 3,350 native plants were catalogued before an exhaustive study of the subject could be undertaken. All kinds of tropical fruits grow luxuriantly, many of them without cultivation. In point of value the banana heads the list. Cocoanuts, oranges, lemons, limes and pineapples are grown for shipment in larger or smaller quantities to correspond with the demand in foreign markets, the supply being practically unlimited. The anon, mango, rose-apple, pomegranate, sapote, tamarind, fig; citron, guava, aguacate (alligator pear), mamey and guanabana are abundant. The cultivation of grapes was forbidden by the Spaniards in the interest of the wine merchants of the Peninsula. Coffee culture was at one time a flourishing industry; and since the comparatively small amount still grown in the eastern end of the island is of excellent quality coffee may prove one of the minor sources of Cuban wealth in the future. Cotton grows freely in Cuba. Its cultivation on a commercial scale, abandoned after the liberation of the slaves, was resumed experimentally in the province of Oriente in 1902–03. In all parts of the island grasses grow rankly, and forage is abundant throughout the year. Other conditions favorable to cattle-raising are the mildness of the winters, the streams of fresh water and the ready access to important markets on the Atlantic coast. Before the insurrection there were two and one-half millions of cattle in Cuba; at its conclusion not more than 75,000. The promotion of this industry was encouraged by the Palma administration in 1902–03, and undertaken largely by American capitalists.

History.— A score of years after the discovery of America, the town of Baracoa was founded by Spaniards under the leadership of Velasquez. Next, in rapid succession, came Trinidad, Sancti Spiritus, Puerto Principe and Santiago, dating from 1514 to 1515. In the year last mentioned Velasquez founded the original town of Havana (San Cristóbal de la Habana) on the south coast; but in 1519 the present site on the north coast was chosen, and to it the settlers of the older town were transferred. So important did this new Havana appear to be that the first governor of Cuba called it «The Key of the New World.» Burnt by the bucaneers in 1528, it was rebuilt and surrounded with fortifications by De Soto. Again captured and sacked by pirates in 1556, it was again fortified, more strongly, by direction of the Spanish Crown. Morro Castle was begun before 1600. During the 16th century the value of Cuba in Spanish eyes was precisely what the words «Key of the New World» expressed. At its ports expeditions were fitted out for conquest and exploration of the mainland; but there was no thought of obtaining revenues from the island itself except by the discovery of the precious metals, the futile search for which was never quite abandoned. When the first plants of sugarcane were imported from the Canary Islands to start an industry more remunerative than mining, it became necessary to import slave-labor from Africa. The Indians had been nearly exterminated — not entirely so, as is commonly asserted, for the aboriginal strain can still be detected in the physiognomy of some Cubans. English, French and Dutch pirates continued to ravage the coasts during the next century. Cuban cities of that time, with their old-fashioned defensive works, were like the walled towns of mediæval Europe. An attack of the Dutch fleet upon the capital was repulsed in 1628; in 1762, however, a force of English and American colonial troops, under Lord Albemarle, took Havana, which they held until, by the terms of the Treaty of Paris of 1763, Spain regained possession. A period of moderate prosperity and exceptionally good government followed; Las Casas, who came out as captain-general in 1790, worked earnestly and wisely to promote Cuba's interests; the Cubans, for their part, evinced their appreciation of such considerate treatment by a chivalrous display in Spain's time of need. Havana learned, in 1808, that the Spanish dynasty had been overthrown by Napoleon; thereupon her citizens declared war against Napoleon. And when Spain was losing one after another of her American colonies, Cuba remained loyal. But prosperity brought long years of suffering to the «ever-faithful island,» and the mother country as well. The result was inevitable. When the long-sought treasures of Cuba were at last brought forth, not from the gold mines but from fertile soil, Spain sought to make the treasure all her own, as she had monopolized the precious metals three centuries before. With a few exceptions, the high Spanish officials sent to Cuba were simply belated *conquistadores,* lacking the personal valor, but possessing the acquisitive talent of the adventurers who first exploited Mexico and Peru. The decree of 1825 placed the lives and fortunes of all Cubans at the disposal of the captains-general. Conspiracies, insurrections, filibustering expeditions from the United States, called forth by oppressive measures, and in turn furnishing a poor justification of repressive measures, are the main incidents of the story of the following 70 years marked by the conspiracy of 1829, the rising of the blacks in 1844, the Lopez expeditions in 1849, 1850 and 1851, the revolts in 1855, the Ten Years' War (1868–78) and the revolution of 1895. About 200 Americans took part in the ill-starred expedition of 1851, and of those who surrendered after Lopez's defeat many were shot. Captain-General Tacó (1836) set native Cubans against resident Spaniards by impolitic discrimination, intensifying that antagonism between the two elements of the white population which to-day makes political controversies rancorous. The cause of the revolutionary movements between 1849 and 1855 was the cruelty of a military commission in 1848, more than 3,000 persons being tortured, imprisoned, banished or executed at that time for real or supposed complicity in a plot. The cry of outraged patriotism, the «Grito de Yara,» was heard 10 Oct. 1868. During a part, at least, of the Ten Years' War, the aim of the Spaniards was, as Captain-General Valamaseda wrote, to convert the island into a desert. Spain sent 257,000 men against the insurgents and lost 208,000 of them, according to official reports. The cost of the war, excluding the value of property destroyed, was $300,000,000. Midway in this struggle the *Virginius,* a vessel whose American register had been fraudulently obtained, was captured by a Spanish warship, taken into the harbor of Santiago and about 50 of her officers and men were shot without civil trial. The Treaty of Zanjón (1878) restored the old oppressive conditions; moreover the cost of the war had made a new burden for the island to bear, while vexatious restrictions hampered its commercial relations with other countries. «Underground Cuba» gathered force for a final effort. In February 1895 the flame of insurrection was kindled and, in the course of three years, the whole island was again laid waste. Throughout the last century the government of the United States manifested an interest in

CUBA

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1 View of Havana from Cabanas

2 Central Park and Opera House, Havana

Cuba's fate. In 1823, Monroe being President, a dispatch was sent by the Secretary of State to the American Minister at Madrid, in which the Secretary (Mr. Adams) called particular attention to the commanding position which Cuba occupies with reference to the Gulf of Mexico and the Caribbean Sea, and expressed the opinion that there was no other foreign territory which could compare with it in the sum of the national interests of the United States. In 1825 and 1826 Colombia, being then at war with Spain and designing to invade Cuba and Porto Rico, refrained from this projected attack on the strength of a protest from the United States — a protest in the interests of the slave-power. The new Spanish-American states "always marched under the standard of universal emancipation." Martin Van Buren said in 1829: "It is the interest of the southern section of the Union that no attempt should be made in Cuba to throw off the yoke of Spanish dependence." Webster, in 1848, declared that Cuban emancipation "would strike a death blow at the existence of slavery in the United States." Thus for 20 years the Southern slave-owners insisted that the status of Cuba and Porto Rico should not be changed. The annexation idea came to the front in 1848. A proposition for the purchase of the island was made by President Polk, through his Secretary of State, Mr. Buchanan, who wrote to the American Minister authorizing the latter to offer $100,000,000 to Spain as compensation for the surrender of a colony which was, as we have seen, a particularly troublesome possession just then. The strategic value of Cuba was dwelt upon in this correspondence, and the fear was expressed that the island might fall into Great Britain's hands, in which event that nation would exercise supreme control over the Gulf of Mexico. The offer was declined by Spain. Both England and France were warned in 1852 that the United States would not admit the claim of any other power to intervene in a dispute of which Cuba was the subject. In February 1854 the cargo of an American steamer, the *Black Warrior*, was seized unjustifiably in Havana. It seemed for a time that war, and the acquisition of Cuba by force, might ensue; but reparation was offered by Spain, and was accepted. President Grant intimated in 1875 that "mediation and intervention" might become necessary to put an end to the long struggle then in progress.

The revolution of 1895 falls naturally into three periods: First, that of Capt.-Gen. Martinez Campos, whose fair fighting utterly failed to prevent the spread of the revolutionary movement from the eastern to the western provinces; second, that of Captain-General Weyler, who inaugurated the policy of reconcentration; third, that of Captain-General Blanco — including the events from Weyler's recall to the destruction of the *Maine*. Fighting fairly and like a gentleman, Campos was fairly beaten by men who developed positive genius in guerrilla warfare — Gomez and Antonio Maceo, who knew how to win by skilful evasion, by opportune attack, and, above all, by making an ally of every peasant and living on the country. Maceo crossed both trochas and reached Pinar del Rio province, thus carrying revolt from one end of the island to the other. Among the hills of the Sierra de los Orangos he maintained his band of followers and defied all efforts to dislodge him up to the close of the year 1896. Then he risked his life once too often and was killed. Campos failing to check the insurrection, Weyler was sent to crush it. The reasoning of the latter was strictly logical. He learned that Cuban peasants supplied the rebels with food, with information in regard to the movements of Spanish columns and with ammunition, bought, stolen or brought to the coast by filibusters. He did not shrink, then, from the extreme cruelty involved in the removal of the country folk from their homes to garrisoned cities, where, as "reconcentrados," they should become quite harmless. On 21 Oct. 1896, his proclamation was issued. Thousands of Cuban families were pent in towns or zones under surveillance of a Spanish garrison; and as time went on they died of starvation and fever.

United States and Cuba.— When Spain's Prime Minister, Canovas del Castillo, was assassinated, 8 Aug. 1897, the prop of Weyler's Cuban policy was withdrawn. His successor, General Blanco, took to Cuba a policy of compromise. Autonomy was offered; and, for the rescue of the reconcentrados, the suggestion was made that charitable people in the United States might forward supplies to be distributed by the American consuls in Cuba. The proposal of autonomy was rejected with emphasis. General Blanco's emissary who brought the message was shot by an insurgent commander. And when it became known that an appeal for contributions to feed starving Cuba had been made in the United States, formidable riots in Havana expressed resentment of the proffered relief, which was regarded as the entering wedge of the dreaded intervention. For the protection of American interests the Atlantic squadron was ordered to make its headquarters at the Dry Tortugas, within six hours' sail from the Cuban capital; and on 25 January the battleship *Maine* was sent to Havana harbor. The Spanish government sent the cruiser *Viscaya* to New York harbor soon afterward. On 9 Feb. 1898, a letter addressed to Señor Canalejas by Señor Dupuy de Lome, Spanish Minister to the United States, was published in the newspapers of the latter country. Its cynical tone and insulting characterization of President McKinley were resented, and Señor de Lome resigned his office. One week later the *Maine* was destroyed "by the explosion of a submarine mine," — to quote from the report of the court of inquiry — "which caused the partial explosion of two or more of her forward magazines." The court was unable to obtain evidence fixing the responsibility upon any person or persons; before the official investigation was made, however, public opinion in the United States had rightly or wrongly assigned the responsibility, and war with Spain seemed inevitable. On 8 March, the House of Representatives passed a bill appropriating $50,000,000 for national defense. Senator Redfield Proctor's statement of his personal observations in Cuba, read to the Senate 17 March, did not make for peace. It confirmed previous reports which had excited pity and indignation. Diplomatic representatives of the six great European powers called at the White House 7 April to present a joint note, a "pressing appeal" for "the maintenance of peace." President McKinley's reply was conciliatory, but the resolve he had formed was expressed in his message of 11 April: «In the name of humanity, in the name of civilization, in behalf of endangered American interests, which give us the right and the duty to speak and act, the war in Cuba must stop.» The war in Cuba had, indeed, stopped or halted. The queen regent of Spain had directed General Blanco to proclaim a suspension of hostilities, in order to prepare and facilitate the restoration of peace; and the President's message concluded with the statement that he had received official information of this circumstance. The text of General Blanco's proclamation had been published, and the orders of General Weyler revoked. It was asserted that the reconcentrados were to be permitted to return to their homes; that the sum of $600,000 had been voted for their relief; and that public works had been undertaken for the purpose of giving employment to the poor. Spain had offered to submit to arbitration the disputes which might arise in the matter of the *Maine*. President McKinley called attention to all these things, and requested that they should be given full weight in the deliberations of Congress. But the «full weight» of such programs had been ascertained. The reports of American consuls in Cuba accompanying the message described conditions which it seemed impossible to reform without forcible intervention. The famous joint resolutions of 19 April recognizing «the independence of the people of Cuba, demanding that the government of Spain relinquish its authority and government in the island of Cuba, and withdraw its land and naval forces from Cuba and Cuban waters, and directing the President of the United States to use the land and naval forces of the United States to carry these resolutions into effect, concluded with the words: «The United States hereby disclaims any disposition or intention to exercise sovereignty, jurisdiction, or control over said island, except for the pacification thereof, and asserts its determination when that is accomplished to leave the government and control of the island to its people.»

The Spanish-American War began on 21 April 1898; Admiral Cervera's fleet was destroyed off Santiago 3 July; the formal surrender of Santiago took place on 17 July. In the protocol suspending hostilities which was signed on 12 Aug. 1898, it was provided that Spain should relinquish all claim of sovereignty over and title to Cuba, and that Cuba should be immediately evacuated. The evacuation proceeded gradually; the last of the Spanish troops leaving 1 Jan. 1899. The participation of the revolutionary army in these events has two noteworthy features: A force of about 3,000 Cubans, led by Gen. Calixto Garcia, joined the American troops as Aserraderos and served through the Santiago campaign, forming a part of the line about the city. Later, the retiring Spanish army was closely followed, outside of the chief cities, by the Cuban army, which took charge of the towns and country, maintaining order and performing police duty; and, when finally disbanded, dispersing peacefully among the people. The treaty of Paris, signed 10 Dec. 1898, provided for the temporary occupation of the island by the United States. By an order dated at Headquarters of the Army, Washington, 13 Dec. 1898, a division known as the Division of Cuba was created, under command of Maj.-Gen. John R. Brooke. The authority of military governor of the island was exercised by General Brooke from 28 Dec. 1898, until 20 Dec. 1899, when he was succeeded by Maj.-Gen. Leonard Wood, who continued in office until 20 May 1902. During the entire period of American occupation (18 July 1898 to 20 May 1902), the total revenues were $57,197,140.80; amount in hands of the treasurer at the close of business, 19 May 1902, $635,170.29. The latter sum was paid to the republic of Cuba; the former was expended for maintenance of the government ($2,780,781.16), justice and public instruction ($11,108,187.46), sanitation ($9,706,258.20), public buildings, works, ports and harbors ($5,833,607.90), charities and hospitals ($4,124,986.60), barracks and quarters ($2,525,483.78), etc. A comparatively small amount was used for the pay of the army; very large sums devoted to works of public utility, in the interests of the Cuban people. Cuban imports during this period amounted to $225,437,135, the largest items being foodstuffs, animals and animal products, cotton, silk, vegetable fibres, wool, etc., and metals and metal manufactures. From the United States came 43 per cent of imports, while the rest of the world supplied 57 per cent. Cuban exports amounted to $180,609,067, the United States taking 75 per cent. The articles exported to the United States were tobacco and its manufactures, $45,400,670; sugar and molasses, $77,648,819; wood, unmanufactured, $1,751,451; iron and manganese ore, $2,587,715; fruits and nuts, $2,547,392; all other articles, $5,479,092. Thorough sanitary measures were adopted; the death-rate of the island was lowered; the causes of yellow fever were discovered, and that disease nearly exterminated. Especially successful were the efforts to beautify Havana and improve its sanitary condition. That city became one of the most attractive in Latin America. The reforms extended to the prisons, hospitals and asylums. A general system of free schools was established throughout the island and, in many practical ways, Cuba was prepared for self-government. A constitutional convention, the members of which were elected 15 Sept. 1900, met in the city of Havana the following November. The constitution of Cuba was adopted 21 Feb. 1901, and an appendix thereto (the «Platt Amendment») 12 June 1901. A form of government was thus provided which, in its main features, resembled that of the United States. The appendix, however, curtails Cuban independence. Its eight articles follow:

1. The government of Cuba shall never enter into any treaty or other compact with any foreign power or powers which will impair or tend to impair the independence of Cuba, nor in any way authorize or permit any foreign power or powers to obtain by colonization or for naval or military purposes, or otherwise, lodgment or control over any portion of said island. 2. That said government shall not assume or contract any public debt to pay the interest upon which, and to make reasonable sinking-fund provision for the ultimate dischage of which the ordinary revenues of the Island of Cuba, after defraying the current expenses of the government, shall be inadequate. 3. That the government of Cuba consents that the United States may exercise the right to intervene for the preservation of Cuban independence, the maintenance of a government adequate for the protection of life, property, and individual liberty, and for discharging the obligations with respect to Cuba imposed by the Treaty of Paris on the United States, now to be assumed and undertaken by the government of Cuba. 4. That all the acts of the United States in Cuba during the military occupancy of said island shall be ratified and held as valid, and all rights legally acquired by virtue of said acts shall be maintained and protected. 5. That the government of Cuba will exe-

cute, and, as far as necessary, extend the plans already devised, or other plans to be mutually agreed upon, for the sanitation of the cities of the island, to the end that a recurrence of epidemic and infectious diseases may be prevented, thereby assuring protection to the people and commerce of Cuba, as well as to the commerce of the southern ports of the United States and the people residing therein. 6. The Island of Pines shall be omitted from the boundaries of Cuba specified in the constitution, the title of ownership thereof being left to future adjustment by treaty. 7. To enable the United States to maintain the independence of Cuba, and to protect the people thereof, as well as for its own defense, the Cuban government will sell or lease to the United States the lands necessary for coaling or naval stations, at certain specified points, to be agreed upon with the President of the United States. 8. The government of Cuba will embody the foregoing provisions in a permanent treaty with the United States.

The convention adopted the foregoing articles reluctantly, after considerable delay, and relying upon representations made to certain delegates by President McKinley, Senator Platt and other officials at Washington, that the tariff on Cuban products sent to the United States would be reduced, as a proper concession in view of the surrender by Cuba of such valuable privileges. The Congress of Cuba (elected 31 Dec. 1901 and 24 Feb. 1902) was convened in Havana 5 May 1902, to examine into the credentials of its own members and to count and ratify the electoral vote. At 12 o'clock noon, 20 May 1902, the Republic of Cuba was established; Tomás Estrada Palma being President and Luis Estevez Romero Vice-President. The transfer was made in the reception hall of the palace of the military governor. A salute of 45 guns was fired while the document of transfer and President Palma's reply were being read; the troops of the 7th United States Cavalry, formed in the plaza before the palace, presented arms; the band played the American national air, and the American flag was lowered. Next the Cuban flag was hoisted and greeted with the national salute of 21 guns by the U. S. S. *Brooklyn;* the Cuban national air was played; the American troops saluted the Cuban flag and then immediately embarked.

Cuba Independent.— There remained on the island, at Santiago, Cienfuegos and Havana, small forces of artillery, for the preservation and care of the coast defenses and to avoid leaving the island entirely defenseless against external attack, pending such arrangements for naval stations as were contemplated. Though the failure to secure tariff concessions from the United States as promptly as was expected increased the difficulty of their financial problems, the people of Cuba have a fair record for the first year of their independence. An intelligent effort was made to keep the most important industries moving along in the usual way and to preserve order throughout the island, the single conspicuous exception being the strike of tobacco workers in Havana (November 1902). From the first the balance in the treasury showed a tendency to increase. The completion of the central railway, connecting Santa Clara with Santiago, and the western with the eastern provinces for the first time by a continuous line of railway transportation, gave a new impetus to industrial development in 1903. The treaty of reciprocity between the United States and Cuba, having been approved by the Senate of the United States, 17 March 1903, and by the Cuban Senate, 28 March 1903, was submitted to and accepted by the House of Representatives at Washington, convened in extraordinary session 9 Nov. 1903. Violent disputes between the Cuban Liberals and Moderates, culminating in the insurrection of 1906 which the Palma government was unable to suppress, led to the second American intervention. A census of the island was taken and fresh elections were held in 1907; and in January 1909 the American troops were again withdrawn. On 16 March 1912 the hull of the battleship *Maine,* having been raised by American engineers, was towed three miles outside of Havana harbor and sunk. On 20 May 1913 Gen. Maria García Menocal (Conservative) was inaugurated as President and Dr. Enrique José Varona as Vice-President. In 1915 the Cuban delegation to the Pan-American Financial Conference reported most favorably in respect to the important and very close commercial and financial relations between the United States and Cuba, so essential to the latter's well-being and political stability. This favorable condition "obviously is due in great measure to the beneficial operation of the reciprocity treaty entered into between the two countries in the year 1903, as may be seen by the statistics showing the increase in the reciprocal trade relations since the treaty was put into effect." (Memorandum submitted by the Cuban delegation, page 384). Again, in the group conference report, page 379: "So clearly has it been recognized that these special relations (which were established by the reciprocity treaty) existed between Cuba and the United States that many measures are already in force for promoting intimate commercial and financial relations which in the case of other countries are only in the preliminary stage. From the beginning the national loans of Cuba were taken by American bankers and are still held largely in the United States. The means of transportation and other public utilities have also been, to a large extent, established and are now operated by American capital." (For the expansion of Cuba's trade with the United States, and a summary dated 1 May 1916 of the island's whole foreign trade, see under COMMERCE). On 11 Feb. 1917 two companies of soldiers encamped just outside Havana mutinied, and on 12 February, three days before the date set for the new presidential election, nearly the entire force of government troops in Ciego de Avila, Santiago de Cuba and other towns in the eastern part of the island revolted and took possession forcibly of those districts. The Cuban government met the crisis with energy and had the moral support of the government of the United States; accordingly the revolt was suppressed in less than two months (before the middle of April 1917).

Government.— Executive powers are conferred upon the President, who is assisted by a cabinet of nine officers, the Secretaries of State, of Justice, of Government, of the Treasury, of Public Works, of Agriculture, Commerce and Labor, of Public Instruction and the Fine Arts, and of Health and Charities and of the Executive Department. The Cuban Assembly, on 11 July 1917, approved a measure passed by the Senate creating the Cabinet office of War and Marine. Both President and Vice-President are elected indirectly, by an electoral college, for the term of four years; and they cannot serve more than two consecutive terms. The legislature or National Congress is composed of the Senate (24 members) and the House of

Representatives (83 members). Senators are elected indirectly for eight-year terms, four senators for each province, and the Senate is renewed by halves every four years. Representatives are elected by popular vote for four-year terms, at the rate of one representative for every 25,000 inhabitants. Every male citizen 21 years of age or over has the right of suffrage. The House is renewed by halves every two years. Congress meets twice each year, on the first Monday of April and November, and the regular sessions last 40 days or more. The judiciary consists of a National Supreme Court, six superior courts, courts of first instance and minor courts. Justices of the Supreme Court are appointed by the President with advice and consent of the Senate.

Education.— The census returns of 1907 show that there were then in Cuba 31 per cent of illiterates. This good showing was the result of the establishment of the present elementary and secondary school systems, by which each municipality was required to have a school board and every town to have schools, at which the attendance of all pupils within school age should be obligatory. On 30 June 1915 there were 2,686 school buildings, 4,931 teachers and 289,692 pupils in Cuba with an average attendance of 183,947. There are six secondary schools or «institutes» maintained by the government, one in each province. Annexed to each of these is, with the one exception of the province of Havana, a special school of land surveying. Attached to the Institute of Havana are schools of commerce, navigation, stenography and typewriting and other special branches of learning. In these various institutes there were over 2,000 students in the fiscal year 1915–16. The University of Havana has three faculties: liberal arts and sciences, medicine and pharmacy and law. In the fiscal year 1915–16 there were in attendance at the University 1,432 students. Very liberal provisions have been made by the government for the maintenance of the elementary and secondary schools of the nation. The Department of Public Instruction and Fine Arts is divided into two sections, one having charge of the elementary schools and primary education and the other directing the normal and high schools, the National University, the School of Arts and Crafts, the School of Painting and Sculpture, the National Conservatory of Music and Declamation, the National Astronomical Observatory and the national and other public libraries. The establishment of normal schools in the provinces was authorized by law in 1915.

Army and Navy.— The regular army and rural guard together have 444 officers and 11,000 men. The navy, according to the Official Bulletin of the Treasury Department (Havana, January 1916) has 18 vessels — the *Cuba* (2,055 tons), *Patria* (1,200), *Hatuey* (538), *Baire* (500), *Yara* (339), *10 de Octobre* (208), *24 de Febrero* (208), *20 de Mayo* (141), *Enrique Villuendas* (132) and nine other boats of less than 100 tons.

Agriculture.— The staple products of Cuba include tobacco, sugar, coffee, cocoa, potatoes, tropical fruits and cereals. As early as the 16th century the sugar industry was established under the special protection of Spanish sovereigns, but at the beginning of the 20th century, after more than 300 years had passed, only about 7 per cent of the area of the island was devoted to the sugar crop. In other words, about 2,000,000 acres out of the total 28,000,000 acres. During the 17th and 18th centuries the annual output was about 28,000 tons. This increased to 75,000 tons in the first quarter of the 19th century, to 200,000 tons in 1840, and to nearly 300,000 tons in 1850. The increase is significant, for it was directly occasioned by the withdrawal of an annual allowance of $1,000,000 that Spain made to the Cuban administration out of the revenues from Mexico. The loss of Mexico to the Spanish Crown closing that source of income, Cuba was thrown upon her own resources, with the result that she turned her attention more earnestly to the development of this profitable form of agriculture. The period 1853–68, in which the amounts produced increased from 322,000 to 749,000 tons, was in a restricted sense Cuba's Golden Age. Not until 1891 was a greater amount obtained. The million mark was passed in 1894 and 1895.

The insurrection beginning in 1895 reduced the crop of the following year to 225,221 tons, and the continuance of hostilities in 1897 and 1898 forced the output of those years down to 212,051 and 300,000 tons, respectively. With the restoration of peace in 1898, a new era of development began; and though four years passed before the injuries to mills and fields could be fully repaired, the conditions at the beginning of 1903 justified the hope that the prosperity of the best years before 1896 would be regained. In the year 1840 the output of beet-sugar for the world was but 50,000 tons, principally grown in France. From that date the production of this competing industry increased so rapidly that in 1894 it was 3,841,000 tons, and naturally this enormous addition to the world's supply caused a reduction in the price of cane-sugar which seemed ruinous, and indeed proved to be ruinous to the planters of many sugar-growing countries. But in Cuba the problem of producing sugar at a profit, despite the constant tendency toward lower prices, has always been met. It was solved in the great crisis of 1884, and in more recent years whenever presented. In 1902–03 improvements in agricultural methods, machinery and management effected a reduction of the cost of the standard grade on some of the larger estates to much less than two cents a pound. Such results could not have been achieved unless the soil and climate were in the highest degree favorable to the growth of sugarcane. Yet large districts in which the soil is equally good had never been touched by the plow. In the fiscal year 1912–13 the sugar crop of Cuba was 2,443,986 tons. This had been increased in 1915–16 to 3,007,915 tons. The value of sugar products exported from Cuba to the United States in 1915 was $193,476,972; and in 1916, $266,743,554, exclusive of molasses and confectionery which, in 1916, were valued at $4,338,429. In this latter year the total Cuban sugar crop was valued at over $360,000,000. Cuba produced 696,067 gallons of rum in 1915 and 420,517 in the following year. An additional cane product was alcohol, of which the output was 649,722 gallons in 1914, and 2,021,116 gallons in 1915.

Soil and climate are also favorable to the production of valuable tobacco. The area in which the characteristic Cuban leaf can be grown is, however, much more restricted. The systematic cultivation of tobacco was not begun in Cuba until 1580, though the indigenous plant had been grown by the natives before the first voyage of Columbus in 1492. Early in the last century the leaf grown in the Vuelta Abajo district (an area of about 90 miles in length by 10 in width, situated in the province of Pinar del Rio) won recognition the world over on account of its excellence; and as the profits of this industry, wherever it could be carried on advantageously, were much greater than those of sugar-making, no effort was spared to extend the area of production into other parts of the island. At least 10,000 tobacco plantations were in operation before the year 1880, but all experiments demonstrated the inferiority of the soil for this use outside of the Vuelta Abajo. Before the revolution of 1895, the production of leaf-tobacco in the island was about 560,000 bales (averaging 50 kilos each) in a year. Of this amount about 260,000 bales were harvested in Pinar del Rio province, about 70,000 bales in the province of Havana, 130,000 bales in the province of Santa Clara and 100,000 bales in the province of Santiago (Oriente). Only the 260,000 bales from Vuelta Abajo were of the finest quality, the other components of the annual crop being known as the Partido leaf, the Remedios leaf and the Gibara or Mayari — in the main coarser and cheaper grades. The amount of soil available for the production of first-class tobacco being thus limited, the conditions under which it had to be grown were also not at all favorable to either great or cheap production before the year 1903. First-class tobacco lands of the Vuelta Abajo were held at an exceedingly high price, and large rentals were demanded. Irrigation and constant care in most sections were absolutely necessary; efficient labor was scarce, and untrained laborers were not employed lest their blundering should ruin the product of the best fields. The average cost of production per caballeria (33.17 acres) painstaking investigation showed to be in that part of the island between $8,000 and $9,000; and the conclusion is that the production of tobacco in Cuba before 1903 was much more expensive than in any other part of the world. For this reason, and in view of the failure to secure good results outside of a few small districts, it appeared that the tobacco industry was destined, as compared with the cultivation of sugar, to play a secondary rôle, though still an important one, in the commercial development of Cuba. During seasons of moderate prosperity it furnished employment for about 80,000 persons. The value of its product exported to the United States annually, before the insurgents laid waste the Vuelta Abajo and Partido districts, was between $9,000,000 and $13,000,000. The transfer in 1902–03 of large interests to American capitalists led to the introduction of modern labor-saving devices and economical methods. Formerly growers made the mistake of collecting seeds from inferior third-growth plants, and the result was seen in a gradual degeneration of the plants and diminution of their leaves. To check this degeneration, strong fertilizers had occasionally been used in such large quantities that the leaves, while regaining their lost size, lost much of their fine quality. This was done even after it became a matter of common knowledge that the crops could be improved by scientific selection of seeds. For work in the fields, antiquated wooden plows were still used in 1902; and the tobacco land was cultivated in small farms, an arrangement that seemed necessary to those who employed only the primitive methods of destroying insects and ignored the spraying machine. So long as the old methods prevailed, a native family could not take care of more than a small field; moreover, the labor of the entire family was required, for work went on day and night. Every leaf had to be examined frequently and kept free from tobacco caterpillars. The wife and children aided the adult male laborer, taking turns throughout the 24 hours. In such details as these, improvements were made by the new management, not without opposition. The early attempts to introduce reforms in the established methods of handling the leaf in the manufactories was one cause of the strike of operatives and the riots in Havana (November 1902). Leaf tobacco to the value of $15,232,231 was exported from Cuba in the fiscal year 1914–15; and to the value of $16,156,004 during the following year. Of this latter $12,536,808 worth went to the United States, which, in 1915, took 63.26 and in 1916 63.55 per cent of Cuban tobacco exported. Leaf tobacco valued at $15,661,332 and cigars and cigarettes at $3,618,868 went from Cuba to the United States in 1916. Of this the greater part was shipped from Havana, which exported leaf tobacco to the United States valued at $15,627,894, and cigars and cigarettes at the total output of $3,618,868.

Commerce.— The value of Cuban foreign commerce in 1914 was $296,555,000, and in 1915 $409,739,996; one explanation of these large figures being that the area of the land devoted to sugar crops was so increased that the crop grown in 1914 and available for exportation amounted to 2,500,000 tons. The chief products exported by Cuba are sugar and its products (73.4 per cent of total in 1914); tobacco — leaf and manufactures (15.3 per cent of total); fruits, coffee, cocoa, etc. (2 per cent); minerals (1.9 per cent); other articles (7.4 per cent). The principal articles imported by Cuba are foodstuffs (39.3 per cent of the total in 1914); textiles, etc. (13.5 per cent of total); instruments, machinery, etc. (9.9 per cent); drugs, chemicals, perfumes, etc. (6.6 per cent); all other articles (30.7 per cent). The island exports practically all it produces and imports nearly everything it consumes. Conditions are not favorable to manufacturing, and excepting cigars, but little is done. There is one small sugar refinery, the product of which is sold in the home market, but the rest of the product is exported raw. Cuba's imports from the United States in 1915 were valued at $104,723,108; from the other American countries, $8,022,586; from Germany, $799,903; from Spain, $10,807,435; from France, $5,197,110; from Great Britain, $15,287,998; from other European countries, $6,203,081; from all other countries, $4,397,012. In the same year Cuba exported to the United States goods valued at $206,164,414; to the other American countries, $3,356,875; Spain, $8,021,230; France, $1,135,404; Great Britain, $33,033,016; other European countries, $1,864,769; to all other countries, $716,048. The value of Cuba's imports was $155,448,233, and of her exports, $254,291,763, making the total for foreign commerce, as above stated, $409,739,996. Cuba's trade with the United States alone had expanded from $66,000,000 in the closing year of the last century to $310,887,522 in 1915, under exceptional conditions, created by the European War, which also affect banking relations.

Cuba's total foreign trade for the period of June 1915 to July 1916 amounted to $537,825,000. Exports aggregated $336,801,000 and imports $201,024,000, the balance of trade in Cuba's favor being $135,777,000. In 1916 Cuba imported gold, silver and platinum to the value of $13,036,638; chemical products, $8,248,171; textiles, $28,612,074 (cotton and cotton goods, $9,242,562); paper and paper goods, $3,870,470; wood and wood products, $6,431,060; animals and animal products, $10,150,580; machinery and instruments, $37,574,493; foodstuffs, $64,540,000; metals of all kinds, $14,244,395; stone, earth and ceramics, $7,902,711; miscellaneous, $10,815,286. Goods to the value of $10,815,286 were admitted free of duty. Cuban currency imports were $14,563,631 in 1915, and in the following year $32,316,594. In 1916 the value of imports from the United States was $185,337,194 out of a total of $248,278,279; and of exports $250,090,418 out of a total of $356,571,350. In the same year the principal exports were valued as follows: Animals and animal products, $3,364,738; sugar and sugar products, $271,081,983; fruits, grains and vegetables, $3,164,828; mineral products, $11,398,979; tobacco products, $25,887,513; miscellaneous products, $4,631,447; currency, $34,781,640. Total commerce, $605,068,234.

Banking and Finance.— Some of the principal banks of Havana are Banco de Cuba, Banco Nacional de Cuba, Bank of Nova Scotia, Fidelity and Deposit Company of Maryland, La Nacional, The Royal Bank of Canada, The Trust Company of Cuba, and the Banco de la Habana with which The National City Bank of New York had made certain arrangements. Cuba has adopted a system of coinage founded on a parity with the American gold dollar, and the new monetary law declares money of the United States to be legal tender in Cuba. As a matter of fact, currency of the United States has long been employed in commerce as a supplement to the gold money of Spain and France. The new unit created in 1915 is the gold peso, worth exactly one dollar (gold of the United States), and the law provides for pieces of $20, $10, $5, $4, $2 and $1, together with silver pieces of one peso, two-fifths, one-fifth and tenths (10 centavos), and also subsidiary coins down to one centavo or one cent. Cuba has no paper money. The law establishing the new currency provides that only coins of the Republic of Cuba and the national currency of the United States shall be legal tender in future; but this, of course, does not affect the validity of outstanding contracts. As intimated above, the American-Cuban trade, which had increased somewhat less than threefold (or to $182,000,000) before the European War, made its further advance in 1915 under exceptional conditions. These are explained as follows: In the past a large part of the island's banking business was carried on through Cuban banks with London, Paris and Hamburg, from which blank credits were obtained and used in Cuba for the movement of crops and advances made to planters. But the European War changed this state of affairs, and Cuba applied to American banks for the credits that Europe could no longer grant. The banks of the United States facilitated the granting of those credits to Cuba by means of loans secured by warehouse deposits of sugar, the price of which had advanced in comparison with prices of the two previous years, or by shipments of that product to the United States. The budget of 1914–15 was, by executive decree, continued in force for 1915–16 and for 1916–17. It showed estimated receipts $41,820,580 and expenses $40,262,905. The principal items of this estimated income were customs revenue, $29,100,000; consular fees, $670,000, distributed as follows for expenditure: Home Affairs, $11,044,249; Finance, $2,861,018; Instruction, $5,196,420; Public Works, $5,101,665. The exterior debt at the commencement of 1915 was given as $57,420,000, the interior debt being $10,408,000.

Transportation and Communication.—The aggregate extent of the Cuban railways was 2,359 miles in 1916. The four systems in Cuba are the United Railways of Habana, 705 miles; the Cuba Railroad, 589 miles; the Cuban Central Railway, 349 miles; and the Western Railway of Habana, 147 miles. Railways connect the principal towns and seaports of the island; and the principal sugar properties have their own private railways connecting with the main lines. Others were under construction in 1917. Among the more important steamship lines entering Cuban harbors in 1917 were the New York and Cuba Mail S. S. Co. (American) with bi-weekly service between Havana and New York, bi-monthly passenger service to Guantanamo and Santiago, weekly freight service to the same ports, and weekly service to Mexico; the United Fruit Co. (American), with weekly passenger and freight vessels between Havana and New York, New Orleans and Boston; the «P. and O.» Line (American), with daily, except Sunday, passenger and freight connections with Key West; the Munson Line (American), with weekly freight service to Mobile and frequent freight connections between important ports of the United States and Cuba; the United S. S. Co. (American), with bi-weekly freight service from Galveston to Havana; the American and Cuban S. S. Line, with fortnightly freight service between New York and Cuba; the Herrera Line (Cuban), with fortnightly service, Santiago to Porto Rico; the Royal Mail Steam Packet Co. (English); the General Transatlantic Line (French), with monthly passenger and freight service, France to Havana; and the Transatlantic Company of Spain, with monthly service to Spanish north coast ports via New York, and a monthly service to the south of Spain and Mediterranean ports. There were, in 1915, 658 post and 226 telegraph offices; and telephone service was supplied in 114 cities and towns. A commission to report upon a plan for the nationalization of the railway lines was nominated by presidential decree on 16 Feb. 1916.

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CUBA — AMERICAN DIPLOMATIC RELATIONS WITH. Cuba, lying athwart the Gulf between the arms of Florida and Yucatan, has had an important relation to the United States. Its return to Spain in 1763, one year after its capture by an Anglo-American expedition against Havana, was opposed by the English colonists. In the Revolution it was a strategic point for Spanish fleets which regained the Floridas, and later it was the centre of Spanish rule and the Floridas. In 1803 in the debate on Louisiana in the American Congress, its strategic position in controlling the commerce of the Mississippi was considered. In 1807, after Napoleon jumped the Pyrenees and claimed the right to rule Spanish America, the possible destiny of the island attracted the attention of Jefferson, who, while he contemplated the possibility of future annexation, declined an offer of annexation. Both Madison and Monroe, following the policy of Jefferson, declared that the United States would not wish to see the island fall into the hands of any European nation which might use it as a fulcrum against American commerce. Its destiny was a subject of consideration in connection with the events which gave rise to the Monroe Doctrine, and in connection with the later rivalry and jealousy between England and the United States in their advance around the Caribbean. In 1819 to 1826 the American government was apprehensive of British plans to occupy Cuba, first (1819) to counteract the American annexation of Florida, and later (1823 and 1825), to prevent French occupation. In February 1822, Mr. Forsyth, the American Minister at Madrid, suggested to Spain that by recognition of Mexico and Colombia and a liberal system of commerce she might be able to obtain a guarantee of Cuba by the United States, Mexico and Colombia; and the plan of guarantee was considered in 1823 both in Washington and at London. In 1822, when Cuban representatives visited Washington to request annexation in case of a strike for independence, the American government, by advice of Secretary Adams, acted upon a policy of strict moral duty to Spain. In 1825 the American government took steps to prevent a proposed Colombian-Mexican expedition to set Cuba free, and at the same time was apprehensive of the purpose of a French fleet in Cuban waters. Secretary Clay declared that the United States could not consent to the occupation of the island by any European power except Spain. Consideration of its destinies was a great object of the Panama mission. American policy for two decades after 1825 practically guaranteed to Spain the possession of Cuba on condition that she would not cede it to France or England. From 1836 to 1840 the American government feared that Spain in order to replenish her depleted treasury would sell the island to England or France. Even until 1860 there were fears that England, through her influence in Cuba, and by her treaties to suppress the slave trade, or on account of British debts due to British citizens, would obtain a hold on the island which would ripen into possession. After 1840 American influence partly supplanted that of England in Cuba because of the similar interest of Southern and Cuban slave holders. In 1840 and in 1843 the American government officially assured Spain that, in case of any attempt to wrest the territory from her she could rely on the military and naval forces of the United States to aid in preserving or in recovering it.

American extension to California, resulting in plans and in negotiations for isthmian transit routes across Tehuantepec and Central America attracted American attention to Cuba as a controlling position for the protection of these routes and as a station for steamer lines connecting therewith. From 1848 to the opening of the Civil War, Cuba was continually a subject of international dispute or negotiation. The American government, under Southern and commercial influence, persisted in unsuccessful diplomatic efforts to acquire the island, and, although not responsible for the filibustering expeditions of 1849–51, was almost drawn into a policy of forcible annexation by the excitement resulting from the seizure of the American vessel, *Black Warrior*, by the Havana officials for violation of port regulations, and by the famous Ostend Manifesto of 1854, issued as a recommendation by a conference of the American Ministers to Spain, France and England to consider the conditions of Cuba. In 1852 it declined to enter into a joint, tripartite, self-denying agreement, proposed by England and France on suggestion of Spain, against any attempt at exclusive control of the island by either of the contracting parties. Although Marcy repudiated the Ostend Manifesto, the question of annexation by purchase was a prominent administration object until it was lost by Southern secession.

At the beginning of the American Civil War the government at Washington warned Spain that Cuba must not be made a base for enterprises endangering the American Union. During the war, although it felt the need of harbors in the West Indies, it assured Spain that under new conditions resulting from secession, there was no desire for Cuba. The *de facto* government of the Southern Confederacy also disclaimed any designs upon the island. At the close of the war, the abolition of slavery terminated Southern agitation for the acquisition of the island.

Later, inconvenienced by the Cuban revolt of 1868–78, which expected to obtain American aid through the Cuban Junta in New York and sought recognition at Washington, the Grant administration unsuccessfully offered mediation on a basis of independence, later contemplated a policy of recognition of the insurgents which Secretary Fish prevented and finally (in 1875) took steps toward intervention by inviting the views of various European powers. In 1873, the *Virginius* episode, a culmination of a series of irritating affairs, almost precipitated war. After the pacification of Cuba in 1878, the American government urged Spain to establish a more liberal government by independence or autonomy, to adopt a more liberal commercial policy and to secure better protection of American property and persons in Cuba. In 1884 and 1886 it obtained agreements to end discrimination and retaliatory duties, but officials in Cuba found excuses to violate them.

In 1891 it negotiated with Spain a reciprocity schedule for Cuba, which considerably increased American commerce, although the execution of the agreement was obstructed by the Spanish authorities in Cuba. In the Cuban insurrection of 1895–98 the American government, embarrassed both by Cuban activities in the United States and the Spanish treatment of American citizens in Cuba, gave warning that American forbearance had limits, later offered mediation, and finally (after the destruction of the *Maine* in Havana harbor) actively intervened (1898) to terminate Spanish rule with its intolerable conditions in Cuba. After the withdrawal of Spanish forces and officials from Cuba the American government assumed control through a military governor, who inaugurated a series of useful improvements and aided in the establishment (1902) of a new independent Cuban government under a constitution defining future political relations with the United States, on the basis of the Platt Amendment, which provided for American intervention for certain control of financial obligations and foreign relation and for the preservation of Cuban independence and order. The Washington government also negotiated a reciprocity commercial treaty which was ratified in 1903. Later, during a post-election insurrection of 1906, it intervened, assumed control, established a provisional government for the restoration of order, and (in 1909) inaugurated the new independent Cuban government. During the insurrection of 1912, it sent a fleet to Key West to be ready for emergencies, but found that the Cuban government was able to control the situation.

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CUBA, N. Y., town in Allegany County, on the Erie and Pennsylvania railroads (Rochester branch). The principal industries are the manufacture of cheese, butcher knives, stable equipments, flour and pulleys. Borden's condensing plant is also located here. There are two banks, whose combined resources amount to $1,600,000; a modern high school, and six rural schools. Cuba Lake, about two miles north at an elevation of nearly 2,000 feet, attracts many summer visitors. Pop. 1,528.

CUBE, in geometry, a solid contained by six equal square sides. The content of a cube is found by multiplying the superficial area of one of the sides by the height; or, in other words, by multiplying the number that expresses the length of one of the edges by itself, and the product thus found by that number again, and this is called the cube of the number. A cube is generated by the motion of a square plane along a line equal to one of its sides, and at right angles to it; whence it follows that the planes of all sections parallel to the base are squares equal to the base, and consequently to one another.

CUBE, or CUBIC NUMBER, in arithmetic, the result of taking any number thrice as a factor; thus 64 is a cube number, and arises by multiplying 4 by 4 and the result again by 4.

CUBEB, the unripe fruit of *Piper cubeba*, a climbing perennial with smooth stem and alternate lance-shaped, bright green, shining leaves. It is a native of the West Indies, being extensively cultivated in Java and Sumatra. It was introduced into medicine by the Hindus and Arabians, who employed it widely as a condiment also. Cubebs contain about 14 per cent of volatile oil, a small amount of an indifferent substance termed cubebin, and cubebic acid. It also contains a small amount of resin. A mixture of oils, resins and acids comprises the oleorosin of cubebs that is used in medicine. It is an active spice somewhat related to pepper, its botanical ally, but the taste is more pleasant and less pungent. It is used as a local stimulant in indigestion and as a flavoring vehicle in mixtures and gargles. It is valuable, particularly in diseases of the mucous membrane, especially of the bronchi, of the bladder and of the urethra. Cubebs are very frequently smoked in cigarettes, in which form they have a pleasant stimulating effect on the mucous membrane of the bronchi and larynx.

CUBIC EQUATIONS, equations in which the highest exponent of a given quantity in any term is 3. Every such equation of one unknown quantity can be reduced to the form $x^3 + px + q = 0$, where x is the variable and p and q are constants. Every equation of this form has three roots, all of which may be real, or one may be real and two imaginary. The solution of cubic equations was accomplished first by Tartazlin and Cardan. An equation containing any number of variables in which the greatest sum of the exponents of the variables in any term is 3 is called a cubic equation. Thus $x^2y + 5y^3 + 6 = 0$ and $xyz + z^3 = 0$ are cubic equations in x, y, and x, y, z, respectively.

CUBISM, the name given to a movement in painting founded by the Spanish post-impressionist Pablo Picasso (b. Malaga 1881). It has been said that cubists see and depict natural objects as if composed of innumerable cubes. They have often done so, it is true, but that is far from being an essential in practice. The defensible position held by the more thoughtful members of this group is that their movement tends toward the integral, the deep, the complete realization of painting; and the cube of course, by virtue of its third dimension, symbolizes such depth or entirety as distinguished from flat surfaces with their two dimensions. Reasoning cubists say that the beauty of a work resides essentially in the work itself, not in that which is only the pretext for the work. Naturally ardent advocates of this revolutionary movement have occasionally become overenthusiastic — as when they declare that «dans le present, le cubisme est la pienture même.. (cubism is at present painting itself), and that they see in it the only conception at present possible of the pictorial art. But this movement, like others, undergoes transformation, the still newer forms — futurism (q.v.), etc., claiming supremacy in the interpretation of «young» painting and «young» sculpture. See also France — French Art.

CUBITT, Sir **William,** English civil engineer: b. Dilham, Norfolk, 1785; d. 13 Oct. 1861. He was a miller, cabinet-maker and millwright until 1812, when he became chief engineer in Messrs. Ransome's works at Ipswich. In 1823 he joined the Institution of Civil Engineers, and, removing to London, was afterward engaged in most of the public undertakings of his day. The improvement of the Severn and of Boulogne port, the Bute docks at Cardiff and the waterworks for Berlin are among his works. He also invented the treadmill, and constructed the Southeastern Railway; and for his services in connection with the erection of the Great Exhibition buildings he was knighted in 1851. From 1850-51 he was president of the Institution of Civil Engineers.

CUCHIA, a teleost fish of the rivers and estuaries of India and Burma, growing to two feet in length. It is the sole representative of the family *Amphipnoidæ,* and is remarkable for having on each side of the neck a respiratory air-sac, connected with organs resembling the lungs of serpents. When in the water this amphibious fish constantly rises to the surface to breathe air, and is frequently found lying in the grass of the riverbank as if for enjoyment. It is one snake-headed, or walking-fish tribe (*Ophiocephalida*).

CUCHULLIN. See Tain bo Cuailgne.

CUCKOO, formerly spelled cuckow, the English name of a common bird, so called from the note of the male, and now generally applied to all related birds of the family *Cuculidæ.* The cuckoo of Europe, the *Cuculus canorus* of ornithologists, perhaps occupies more space in general literature than any other bird, on account of the interest which attaches to its remarkable habit of nest parasitism, and the equally remarkable but unfounded superstitions which have collected about what is to many persons its mysterious life. It is a common summer bird throughout Europe, retiring in winter to equatorial Africa, its southward migration beginning immediately after the close of the breeding season. During April, May and June the loud «cuck-oo» of the males is one of the most familiar of country sounds; but it wanes with the breeding season. The eggs are invariably laid in the nests of other birds, the hedge sparrow (*Accentor modularis*) and other similar small species being the victims. The female cuckoo is said to deposit her egg on the ground, from which it is then conveyed in the beak to the nest selected, the rightful contents of which are often cast out. A curious circumstance, the reason for which is not fully understood, is that the cuckoo egg is often of the same color as the eggs of its hosts which remain in the nest. The young cuckoo secures the exclusive attention of its foster parents by working itself beneath any eggs or other young birds in the nest, raising them on its back, and tumbling them over the edge of the nest.

The true cuckoos are represented in North America by three or four species of the genus *Coccygus,* of which two, the yellow-billed cuckoo (*C. americanus*) and the black-billed cuckoo (*C. erythrophthalmus*) are the best known and most widely distributed, the former ranging, with its Western variety, throughout the United States, the West Indies, and much of the British provinces, the latter being chiefly Eastern and migrating in winter far into South America. Both species have the bill strongly curved, stout and somewhat flattened at the base, the feet large, with very short metatarsi, the wings long and the tail long and wedge-shaped. Both are of a plain, uniform, bronzy olive-gray above and white, or nearly so, below. They are readily discriminated by the entirely blue-black bill and the absence of bold markings on the tail feathers of the one species, and the partly yellow bill and broad white margins of the tail of the other. In habits the two species differ but little, and except in the manner of deposition of their eggs, not much from the European cuckoo. Both build nests, which are mere loose platforms of twigs placed in thickets and trees, and lay a considerable but variable number of pale green eggs at long and irregular intervals, with the result that the same nest frequently contains freshly deposited eggs along with young birds. Besides the family taint, which the manner of nesting and oviposition suggest, both species occasionally appear to fall into the parasitic habit and place an egg in another bird's nest; it seems that not infrequently the yellow-billed species, which is the chief offender, selects her black-billed relative as the recipient of these parental courtesies. In the Northern States the cuckoos are late arrivals from the South, not appearing until the fully leaved trees and bushes afford them the concealment which their retiring tastes demand. Their presence is soon known by the oft-repeated loud cow-cow-cow, etc., the frequent utterance of which, upon the approach of storms, has gained for them the name of rain-crow. As destroyers of hairy caterpillars, which most birds pass untouched, the cuckoos deserve the esteem of horticulturists. Though subsisting largely on caterpillars they also eat other insects and occasionally fruits. The ground cuckoo or chaparral cock and the anis or Savannah blackbird are also American. The number of exotic species of cuckoo is very great, and many of them are interesting and handsome birds which are frequently exhibited in zoölogical gardens. See Cuculidæ.

CUCKOO BEE, a bee of the genus *Sphecodes,* commensal (q.v.) with the *Andrena, Halictus* and other solitary bees, which burrow in the ground. In their slender, smooth and gaily colored bodies the Cuckoo bees resemble wasps. The females do not sting severely. Although their eggs are laid in the cells of their hosts, and the larvæ feed upon the pollen stored for the young of their hosts, they are quite different in shape, the head being smaller, and the body more cylindrical. The young as well as the adults of both host and commensal may live together harmoniously, the adults of both kinds reaching maturity at the same time.

CUCKOO FLIES, a species of the hymenopterous family *Chrysididæ*, which, cuckoo-like, live at the expense of various solitary bees and wasps, but, unlike the usual custom of the cuckoo bees (q.v.), actually devour the young of their hosts. They may be seen in hot days briskly flying about and alighting on posts and trees, darting their ovipositor into holes in search of the cells or nests of other *Hymenoptera*, in which to lay their eggs. They feed on the pollen stored up by the host when hatching as maggots. More often they are known to fasten on the back of the larva of their host, suck its blood and thus destroy it; they also appear to destroy the eggs of their host. Although the chrysis lays from 6 to 10 eggs, all but one shrivel up. Chapman has noticed the young larva seize with its mouth-parts a fold of the skin of the helpless larva of the wasp (*Odynerus*) and suck it, without inflicting any visible wound. It spins its cocoon inside that of its host, remaining there until the following spring. *Cleptes* is supposed to prey on saw-flies, probably laying its eggs in the cocoons of the latter.

CUCKOO-FLOWER, or **LADY'S SMOCK** (*Cardamine pratensis*), a common and pretty meadow-plant, order *Cruciferæ*, with pale lilac or white flowers. *C. pratensis* is found in swamps and wet meadows from Labrador to northern New Jersey, in Minnesota and west to the Pacific coast of British America. It is common in England, and throughout northern Europe and Asia. It blossoms in April or May, presenting a very pleasing appearance. It possesses antiscorbutic properties. The name is also given to the ragged-robin (*Lychnis flos-cuculi*) of the pink family.

CUCKOO-SPIT, a froth found on plants. It is a secretion of the larvæ of small homopterous insects, of the family *Cercopidæ*. It serves the purpose of concealing the larva from its enemies.

CUCUJO, coo-coo'hō, or **CUCUYO**, a luminous beetle of the click-beetle family *Elateridæ*, which, in the West Indies, Mexico and northern South America, is often used as an ornament in the hair or upon the dress of women. The Indians capture them by waving about in the air a stick to which they have attached a coal, to the light of which the beetles are attracted, when they may be caught in nets. The Indians keep them in cages of wire-netting, feed them each evening upon pieces of crushed sugarcane, and bathe them twice daily in tepid water. In this condition they are offered for sale in large numbers in the shops and street-markets of Vera Cruz and other tropical cities. The principal species (*Pyrophorus noctilucus*) is from one and three-quarters to two inches in length, and has no beauty by daylight, being rusty brown or blackish; but when belted and attached to a pin in the hair by a delicate chain it glows at night like an immense gem. See Fireflies.

CUCULIDÆ, kū-kū'li-dē, the cuckoo family, the typical one of the order *Coccygomorphæ*. The toes are paired, the first and fourth being directed backward, and the second and third forward; the metatarsi are scutellate and the palate is desmognathous; the wings are variable in size and have 10 primary quill feathers; the tail is usually long and wedge-shaped, with 10, or rarely 8, quill feathers. The family is a large one and comprises upward of 40 genera and nearly 200 species, which are especially numerous in Africa and India. Much uncertainty prevails among ornithologists in regard to the number and arrangement of the sub-families. Shelly, in the British Museum Catalogue, recognizes six: *Cuculinæ*, containing the typical tree cuckoos; *Centropodinæ*, semi-terrestrial birds of Africa, India, etc., commonly known as coucals; *Phænicophainæ*, also mostly of semi-terrestrial habits and including the curious genus *Coua*, peculiar to Madagascar, some similar genera of the Indian and Indo-Malayan region, and the so-called rain birds (q.v.).) of the West Indies; *Neomorphinæ* or *Saurotherinæ*, the true ground cuckoos, comprising the American chaparral cocks, and related East Indian forms; *Diplopterinæ*, comprising a few little-known birds of South America, and finally the *Crotophaginæ*, a small group of remakable typical American cuckoos, represented by the Savannah blackbird. Sometimes the American tree cuckoos are separated as a distinct sub-family, the *Coccyginæ*. See Cuckoo; Coccygomorphæ.

CUCULIFORMES, an order of birds, characterized especially by zygodactylous feet. They comprise two suborders: (1) *Cuculi*, the cuckoos and plaintain eaters (*Musophagidæ*); and (2) *Psittaci*, the parrots, macaws, lories, etc. See Ornithology.

CUCUMBER (*Cucumis sativus* and its congeners), an annual trailing or climbing vine of the natural order *Cucurbitaceæ*, cultivated for its unripe fruits which are used as a salad and for making pickles. The plant is a native of southern Asia where it has been cultivated since early historic time. The vine is more or less prickly, bears three-lobed or angled leaves which closely resemble those of the muskmelon, and generally spiny fruits which may become smooth as they mature. The fruits are solid and contain numerous boat-shaped flattened seeds embedded in a somewhat watery pulp, which in the immature fruits is the part esteemed. Small-fruited varieties and little fruits of large varieties are popularly known as gherkins and are generally preferred for pickles. They are covered with strong brine until needed for use, when, after soaking in pure water to remove the salt, they are put in vinegar, which they soon absorb. There is a great range in size of fruits in the various varieties, some being only about two inches long, and others more than 12 inches by 3 in diameter. Perhaps the most popular group of varieties is the white spine.

Cucumbers thrive best in warm soils well exposed to the sun. They do not produce well upon heavy clays or very light sands. The land must be well drained, in good tilth and fairly rich. For earliest crop the seeds are often sown in hotbeds on inverted sods, and the plants set in the field as soon as danger of frost has passed, a sowing of seed being made about the same time to serve as a second crop. Usually only two or three plants are allowed to remain in the hills which are made about four by six feet apart. Since the cucumber-beetle is very actively destructive while the plants are small, six or eight plants should be allowed to remain in the hills until the vines are able to resist attack. Cultivation should be very thorough until the plants begin to run, when it should be confined to the space not occupied by vines. Often, in making the hills, a forkful of well-rotted manure is mixed with the soil to give the plants a little start.

Of the numerous diseases that attack the plants the one usually seen earliest in the season is damping-off (*Pythium debaryanum*), which appears while the seedlings are small. Infested plants quickly become yellow, and wilt and die. It may be prevented by early spraying with a standard fungicide (q.v.) which should be applied to the whole hill and to the under sides of the leaves. Wilt disease caused by *Bacillus tracheiphilus* is an internal trouble that cannot be combated. The bacteria are spread by insects which inoculate healthy vines by biting or puncturing them. The bacteria multiply in the water-vessels of the vines and impede or stop the flow of water, the leaves wilt and finally shrivel, and the plant dies. It is believed that prevention of the attacks of insects by covering the plants with wire netting until they begin to run will postpone the time of the attack of the bacillus, so that a partial crop may be obtained. Usually the vines die just before the crop is ready to gather, the whole field being attacked. In greenhouses the most common disease is powdery mildew (*Erysiphe cichoracearum*). It appears as white patches on the leaves which become yellow, brown, then die. Often the whole plant is involved. Evaporated (not burned) sulphur and spraying as above will control this pest.

The most important insect enemies of the cucumber are the cucumber-beetles (*Diabrotica*) and the squash-bug (*Anasa tristis*). The beetles are striped or spotted yellow and black, or green and black; are about a third of an inch long, very active in taking flight, and feed mostly upon the under sides of the leaves and the soft stems of seedlings. The larvæ burrow in the roots, and if numerous, they often kill the plants. During the heat of the day the adults generally hide below the surface of the hill. A liberal use of tobacco-dust upon the hills as soon as the plants peep through the soil is the popular remedy. But since remedies are not entirely satisfactory, the plants are frequently covered with netting until they are about to begin running.

The squash-bug is a dull-gray insect about three-quarters of an inch long. It sucks the juices of the plants. There is no known satisfactory remedy for it, but the destruction of the vines as soon as they have fruited or plowing them under is helpful toward its extermination. Hand-picking is sometimes resorted to, as is also the destruction of the eggs, which are conspicuously laid on the under sides of the leaves. The cucumber is frequently grown in greenhouses, especially in spring after the main winter crops are out. The plants are started in pots, transplanted to the benches when well established, trained on trellises close to the roof, kept at a rather high temperature, and allowed to suffer no check. The white-spine class is most popular for this purpose in America, but the long English forcing varieties are by many considered superior in quality.

CUCUMBER BEETLE. See MELONS.

CUCUMBER-TREE, a popular name for two trees which bear cucumber-like fruits. One of these is *Averrhoa bilimbi*, known also as blimbing and bilimbi, which belongs to the family *Oxalidaceæ*. It attains a height of 8 to 15 feet, has pinnate leaves, red flowers in long racemes, and green fruits with acid pulp. It is a native of India and China, is sometimes grown under glass for ornament, and is widely cultivated for food in the warm parts of South America. The other tree is *Magnolia acuminata* of the family *Magnoliaceæ*. It is found from New York to Illinois and southward to Arkansas and the Gulf States. It often attains a height of 90 feet, bears oval or oblong leaves, greenish-yellow flowers two or three inches long in late spring, and cylindrical pink, bitter fruits three or four inches long. The timber is useful for boat-building. *M. macrophylla* is often called large-leaved cucumber-tree. It is smaller than the preceding, more spreading, has fragant flowers and broader and pinker fruits.

CUCURCITACEÆ, the gourd or melon family of plants. They are large herbaceous plants, annual or perennial, with alternate leaves usually palmately veined and scabrous and unsexual flowers. The corolla is monopetalous, regular and with five lobes, often plaited longitudinally; and the petals, usually either yellow, white or green, are deeply veined. The fruit is fleshy and more or less succulent. The general habit is climbing or trailing, by means of tendrils. The family contains 96 genera and some 600 species, and abounds in useful or remarkable plants, including the melon, cucumber, colocynth, etc. They are natives of both hemispheres, chiefly within the tropics. The annuals, however, easily submit to the summer of colder climates and hence are common in northern gardens. Eight genera, comprising about 65 species, are found in America. The principal American genera are *Cucurbita, Micrampelis, Cyclanthera* and *Sicyos.*

CÚCUTA, koo'koo-tä, or **SAN JOSÉ DE CÚCUTA,** Colombia, a city of the department of Santander, near the Venezuelan frontier. It is a place of recent origin which had begun to grow very rapidly when it was destroyed by an earthquake 18 May 1875. Rebuilt soon afterward, it is to-day the handsomest, and commercially the most active, town in the department. It is an important coffee centre. A railway connects it with the Zulia River, which is navigable by small steamers. Pop. about 20,000.

CUDAHY, kud'ạ-hĭ, Wis., city in Milwaukee County, five miles south of Milwaukee, on the Chicago and Northwestern Railroad and on Lake Michigan. The manufactures of the city include rubber goods, machinery, vinegar and gloves, and there are foundries and a meat-packing establishment. Pop. 3,691.

CUDBEAR. See ARCHIL.

CUDDAPAH, kŭd'dạ-pä, India, a district and town in the presidency of Madras. The district has an area of 8,722 square miles, and is transversed north to south by the Eastern Ghauts, and watered by the Pennar and its affluents. The heat is intense in April and May. Soda is found in the hills to the southwest, and is used by the natives in place of soap. Salt and saltpetre likewise abound, and are easily procurable. On the plain round Cuddapah hæmatite and fusiform iron ores are found. On the banks of the Pennar, about seven miles northeast of the town of Cuddapah, are diamond mines, which have been worked for several hundred years, and in which gems of considerable value have been found. The mines have not recently proved profitable. Nearly a fifth of the district is under grain cultivation. Cotton is likewise grown. The town lies on a small river of same name, an effluent of the Pennar, 140 miles northwest of Madras. It exports indigo and cotton, and manufactures a kind of coarse cloth. Cuddapah was formerly the capital of an independent state. Pop. 17,807. Pop. of the district 1,354,291.

CUDWEED, one of the popular names of many small weeds of the genera *Gnaphalium* and *Anaphalis,* of the *Compositæ.* The leaves and stems are covered with a white cottony down, and the flowers are composed of dry scales, and may be kept for a long time. They are also known as everlasting flowers. The genus *Gnaphalium* has about 120 widely distributed species, and the cudweeds belong properly to this genus alone. *G. polycephalum,* common in old fields and open woods, blossoming in October and November, has some repute in household medicine.

CUDWORTH, Ralph, English clergyman and philosopher: b. Aller, Somerset, 1617; d. Cambridge, 26 June 1688. He was educated at Emmanuel College, Cambridge, and became an eminent tutor. He was subsequently appointed rector of North Cadbury, Somerset, and in 1642 published a ‹Discourse Concerning the True Nature of the Lord's Supper,› and ‹The Union of Christ and the Church Shadowed, or in a Shadow.› The first of these productions, which maintained that the Lord's Supper is a feast upon a sacrifice, produced considerable controversy long after the author's death. In 1644 he was chosen master of Clare Hall, and in the following year was made regius professor of Hebrew. In 1654 he was chosen master of Christ's College, Cambridge, where he spent the remainder of his days. In 1678 he published his grand work, entitled ‹The True Intellectual System of the Universe, the First Part, Wherein All the Reason and Philosophy of Atheism is Confuted, and Its Impossibility Demonstrated.› It is a work of great power and erudition, although the attachment of the author to the Platonism of the Alexandrian school has led him to advance some opinions which border on incomprehensibility and mysticism. It champions the innate character of moral ideas which are held to cognize the objective reality of good and evil with the same accuracy which characterizes our geometrical knowledge. Selections appear in Selby-Bigge's ‹British Moralists› (1897). Consult Martineau, ‹Types of Ethical Theory› (Vol. II, Oxford 1898); Lowrey, ‹The Philosophy of Ralph Cudworth› (New York 1885); Birch, ‹Life,› in the edition of Cudworth's works (1743; reprinted 1820), and the preface to Mosheim's Latin translation of Cudworth's works (1733); Seth, ‹English Philosophers and Schools of Philosophy› (1912).

CUENCA, koo-ĕn'kä, Ecuador, capital of the province of Azuay, and in size the third city of the republic, Quito being first and Guayaquil second. It is situated in the canton of Cuenca, 8,640 feet above the level of the sea; the mean annual temperature is one degree higher than that of the national capital, though it lies 189 miles farther toward the south. As a centre of literary and artistic life, and the birthplace of celebrated authors, it is called «the Athens of Ecuador.» Civil, military and ecclesiastical authorities are the governor, town council, bishop, commanding-general of the district, superior court of justice, judge of commerce and chief of police. Principal institutions are the town hall, cathedral, seven churches, and several convents, orphan asylum, hospital, prison, library, parks, the university (with faculties of law, medicine, philosophy and science), lyceum for younger scholars, athenæum, and a school of fine arts, giving instruction in drawing, painting, architecture, music and the history of the arts. It is the centre of a fertile grain, cotton, sugar and cochineal producing region, and rich metal deposits are worked in the neighborhood. The most important manufactures are pottery, hats and woolens, and a considerable trade in preserved fruits, cheese and grain is carried on. Cuenca was founded in 1557, on the site of the old native village Tumibamba, and in 1786 was created an episcopal see. There are numerous interesting Aztec remains in the vicinity. The mountain of Tarqui on the south was chosen in 1742 for determining the meridian line of La Condamine, Bouguer and Godin. At the base of the mountain occurred the battle of Tarqui in 1828 between the Colombian and Peruvian forces. Peruvian bark is an important product. Pop. 30,000.

CUENCA (anciently CONCA), Spain, (1) city in New Castile, capital of a province of same name, 125 miles by rail east by south of Madrid; pop. 11,721. It is a bishop's see, and contains a fine Gothic cathedral. It was built by the Moors and stands on a high and craggy hill, about 3,400 feet above sea-level, between the rivers Jucar and Huescar, which makes it naturally strong. Here the painter, Salmeron, and the famous Jesuit, Molina, were born. (2) The north and east part of the province is mountainous, and fit only for sheep pasture; the other parts are fertile, producing corn, hemp, fruit, etc. Area, 6,636 square miles. Pop. over 260,000.

CUERNAVACA, kwär-nä-vä'kä, Mexico, the capital city of the state of Morelos and the chief town of the district of Cuernavaca. It is siuated on the river Tepeyte, about 46 miles south of the City of Mexico. The Palace of Cortés, where the state legislature meets, is one of its noteworthy buildings; also the meterological observatory and the public library. It contains a church built by Cortés, an agricultural academy, a theatre with a capacity for 2,000 spectators, a hospital and a literary institute. The city is the centre of a fertile district and has extensive sugar refineries and distilleries. Near by are the ruins of an Aztec temple, 400 feet high, composed of five terraces. It was an old Indian village at the advent of the Spaniards and become a favorite residence of Cortés. In 1863 Maximilian made it his residence. It bears many marks of his royal favor, especially in its public gardens. As a health resort it is frequented by those who cannot stand the excessive altitude of Mexico City. Pop. 12,776.

CUERO, kwā'rō, Tex., town and county-seat of Dewitt county, 105 miles by rail east-southeast of San Antonio, on the San Antonio and Aransas Pass and the Southern Pacific railroads, and on the Guadalupe river. It is in a rich agricultural belt, producing corn, rice, truck and cotton, carries on a large trade in turkeys and cattle, and has cotton gins and compresses, a cotton mill, cottonseed-oil mills, machine shops, turkey-dressing plants and a creamery. The waterworks and sewerage system are owned by the town. Pop. 3,109.

CUESTA, kwā'stą, a low ridge with a steep slope on one side and a gentle slope on the other, controlled by the inclination of the rock beds, the gentle slope corresponding to the dip of the beds and being called the dip slope, the steeper descent being known as the scarp or escarpment slope. As the inclination of the beds grows steeper the dip and scarp slopes become more nearly alike, and the ridge is known as a hogback, a ridge produced by the upturned edge of a hard layer of rock.

CUEVA, Juan de la, hoo-än'dā lä kwā'vä, Spanish poet: b. Seville about 1550; d. 1609. Little is known about his life. He spent several years in Mexico where he was a sort of private secretary to his brother Claudio, one of the principal officers of the Inquisition. He also lived for sometime in the Canary Islands. When in Spain he made his home in Seville, which had already become a great literary and dramatic centre. But in 1606 he went to Cuenca. A poet attempting all forms, he excelled most as a dramatist, and is one of the founders of Spanish national drama, and one of the most influential of the predecessors of Lope de Vega. He was one of the most successful and popular dramatists of his day; but it is as an innovator that he is of most interest to the student of Spanish literature. He influenced Guillén Castro y Belvis, who, in his turn, influenced the literature of France and England. Cueva introduced the historical drama; he made use of the old romances, turning them into dramas; and he forecast the *Comedia de capa y espada.* He used, in the drama, material forms not before employed in it. With a free hand he attempted to reform the drama; and in a measure, he was successful. He also introduced the libertine type which Castro exploited so successfully afterward. In a volume of 'Works' (1582), he published a number of lyric poems, sonnets, songs and elegies, including the 'Lament of Venus Over Adonis.' His greatest epic is 'The Conquest of Betica' (1603). He wrote four tragedies, one of them on 'The Sack of Rome' by the Constable Bourbon; and 10 comedies, one of the best being 'The Aged Lover.' Consult Méndez Pidal, R., 'L' Epopée Castillane a travers la littérature espagnole' (Paris 1910); Ochoa, E. de, 'Tesoro del teatro español' (Vol. I, Paris 1838); Walberg, E., 'Juan de la Cueva et son Exemplar Poetico' (Paris 1910).

CUFFEE, PAUL, American negro sailor and philanthropist: b. Westport, Mass., 1759; d. 7 Sept. 1818. His father was an African-born Massachusetts slave, who purchased his freedom, bought a farm of 100 acres and brought up in respectability a family of 10 children; his mother, a Nantucket Indian. At 16 he was a sailor on a whaling vessel, and in 1806 an experienced navigator, owning considerable landed property, houses, stores, a ship, two brigs and several smaller craft. He built a schoolhouse, hired a teacher and opened at his own expense the only public school in the neighborhood of his native town. In 1811 he sailed for Sierra Leone in his ship, the *Traveler,* with a colored crew, won favor there with both whites and blacks, and instituted the Friendly Society of Sierra Leone. In London he was warmly received by Wilberforce and Clarkson, and commissioned by the African Institution to carry goods to Sierra Leone. He died while carrying out his plans for colonizing that country.

CUFIC WRITING, the written characters of which the Arabians now make use, and which we meet in printed works, namely, the Neskhi characters are an invention of the 4th century of the Hegira. Before this time the Cufic characters, so called from the town of Cufa, or Kufa, where they are said to have been invented, were in use. These old characters have so much resemblance to the ancient Syriac writing, the Estrangelo, that it hardly admits of a doubt that the Arabians borrowed them from the inhabitants of Syria. Historical traditions confirm this supposition. The Cufic characters, and perhaps others at an earlier date which essentially resembled them, were probably first introduced among the Arabians a short time before Mohammed. Although we are at present ignorant of the characters which were previously in use among them, and although the imperfect accounts of the Mussulman writers throw very little light upon the subject, yet it is scarcely credible that the Arabians remained destitute of a written character until the 6th century of the Christian era. We find the transition of the Cufic to the Neskhi on the ruins of Chilminar. The influence which the school of Cufa exerted on Islamism caused the use of the character which proceeded from it; and when the others had fallen into oblivion, Cufic writing was the name commonly applied to all kinds of Arabic writing previous to the change made by Ebn Mokla. A knowledge of it is important on account of the many monuments in which it is preserved; especially the coins inscribed with Cufic characters and made in the first centuries of the Hegira.

In connection with these coins are to be considered the small pieces of glass which were introduced, particularly in Sicily, under the dominion of the Mohammedans, instead of money, or perhaps under the sanction of public authority became used as standards of the weight of coins.

CUIRASS, kwē-ras'. Defensive armor protecting the body from neck to hips. The word undoubtedly is derived from the French word *cuir* (leather), probably from the fact that, at the time of its coining, the piece of armor was made of *cuir bouilli* (leather hardened by boiling or steeping in oil); a method practised in several periods. When the cuirass is made up of two parts (front and rear) the fore part is known as the *breastplate, plastron, pectoral,* or (rarely) *mamellière;* the rear portion is termed *dossière.* Perhaps the earliest body armor was the *jazeran,* a jacket of linen, or other strong material, to which were attached scales of bronze or leather. They appear to have originated among the Eastern nations. In the Heroic Age of Greece the cuirass was made of bronze and was worn over a linen tunic. It, apparently, consisted of a breastplate with arm and neck protection composed of lames (strips). From ancient descriptions it was often highly ornamented with repoussé (embossing by hammer) work and sometimes inlaid with gold. About 400 B.C. the Greeks adopted a lighter *tunic* defense (used by the Egyptians and Asiatics) made of layers or folds of linen glued together. The early cuirasses were moulded to the figure and had straps of leather (*lambrequins*) hanging from the lower edge to afford protection to the lower part of the body. These straps were often studded with metal plaques. Etruscan cuirasses were (like the Grecian) made up of a breastplate (*plastron*) and back piece (*dossière*) but the overlapping shoulder-guards, as Etruscan pottery discloses, tend to meet in front, thus differing from the Greek method. They also appear to have worn cuirasses made up of metal discs or plates (scales) or strips sewn on to a padded ground.

The heavily armed troops of the Romans wore a laminated cuirass made up of about seven steel lames encircling the trunk. Each lame was in two parts joined in the centre of the front and back with clasps and hinges, respectively. Four or more curved lames passed over the shoulders, being joined to the corselet at its upper lame front and rear, and moving freely on their pivots at each end. Fixed to the lower edge of the bottom body lame but one, in front, hung three or four lames vertically to protect the middle of the lower part of the body. The body lames were attached to a tightly fitting leather jacket or waistcoat. This armored garment opened in front. Two layers of leather with notched edges attached to the lowest lame and the lambrequins hung below. In the Republican period the Roman cuirass or *lorica* (termed also *thorax*) followed the Greek style with a plastron and dossière held together by straps at the sides and having broad straps passing over the shoulders. These latter fastened to a ring on the breastplate, with permanent attachment to the dossière below the shoulder-blades. The lorica was, usually, of bronze and modeled to the configuration of the body's surface. Straps passed over the shoulders above, while below were two bands of leather, the nether one longer and extending below the upper. And the lambrequins hanged over these, often studded with metal plates, and with a plaited or curled fringe. A tunic was worn under the lorica. The officer of the Imperial period wore the same style of lorica modeled to the figure but it was shorter, few reaching below the waist. The scaled cuirass (*squamata*) was a favorite among the leaders as was also the laminated cuirass. The mediæval period styles and forms of the cuirass will be found under title Plate Armor.

In the «half armor» time (early 17th century), when firearms made armor ineffective, only the cavalry retained the cuirass, wearing it over a buff coat. By the reign of Charles I of England these troops were called cuirassiers. Lancers wore a breastplate, close helmets, gorget, *pauldrons* (shoulder protection), etc. Arquebusiers wore a back and breastplate as did also the pikemen and musketeers.

In modern times, despite the weight, cuirasses were carried in the German army in 1888, but for parade and show. In France the cuirassiers have existed to this day. And the royal bodyguard («Horse Guards») of England still wears a bright, plain steel cuirass and helmet on parade.

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Clement W. Coumbe.

CUIRASSIER, kwē-răs'sēr, a cavalryman wearing the cuirass and helmet. The cuirassier represents the horse soldiers of the 16th and 17th centuries, who wore similar armor. The French and German armies have each 12 regiments of cuirassiers, and the Russian army four. Napoleon III's bodyguard, called *Les Cent-Gardes,* wore cuirasses of aluminum, as do the British Life Guards and Royal Horse Guards on parade. See Cavalry.

CUITLAHUATZIN, kwĕt'-lă-wăt-sĕn', Aztec ruler: b. 1470; d. October 1520. He was the younger brother of Montezuma, and after the latter's death succeeded to the throne, but lived only a few weeks. He was a prisoner in the hands of the Spaniards with his brother, but succeeded in escaping or was released. He organized an active resistance to the invaders and in one of the attacks upon them Montezuma was killed. The warfare he instituted resulted in the defeat of the Spaniards for the time being, and their retreat to the coast. He was succeeded by his cousin Guatemotzin, the last of the Aztec (q.v.) rulers.

CULBERSON, Charles A., United States senator for Texas: b. Dadeville, Tallapoosa County, Ala., 10 June 1855. In 1856 his parents removed to Texas. Charles A. Culberson was graduated at the Virginia Military Institute, Lexington, in 1874. He prepared for a legal career under his father's tuition, completed his law studies in 1876–77 at the University of Virginia. In 1890, and again in 1892, he was elected attorney-general of Texas, and in 1894 and in 1896, governor of the State. He was chosen United States senator in 1899, and again in 1905, and for 1911–17.

CULDEES, kool'dēz, members of an order of monks or an imitation of such an order, in the British Isles and particularly in Gælic Scotland, of which mention begins to occur in mediæval annals and other writings in the 11th century. The name Culdee, in the Scottish Gælic, *Cuilteach,* believed to be equivalent to *gille-Dé* in that dialect and to *ceile-Dé* in the Gælic of Ireland, is by some philologists derived from the Latin *Cultor Dei;* all three words, Scottish, Irish and Latin, meaning servant, or worshipper, of God. The Culdees seem to have been immediate successors or continuators of the communities of monks established among the Picts and Scots of North Britain and the Western Isles by Irish missionaries in the 6th century. They were attached to cathedral or collegiate churches, living in monastic fashion, but without monastic rule. They gradually decayed, became indolent, did away with their vows of celibacy, squandered church property and finally disappeared. The most loyal members were probably absorbed by the larger monastic sects. Some like Dunkeld and Abernethy were superseded by regular canons; Brechin and Dunblane were extinguished at the introduction of cathedral chapters, while Monifieth passed into the hands of laymen. Before the Reformation, Saint Andrew too disappeared. At York was their only English establishment. In Ireland, their seats were at Clones, Devenish and Scattery Islands. Consult Reeves, 'The Culdees' (in Transactions of Royal Irish Academy, Dublin 1864); Lanigan, 'Ecclesiastical History of Ireland' (Dublin 1822); Innes, C., 'Scotland in the Middle Ages' (Edinburgh 1860); Skene, W. F., 'Celtic Scotland' (3 vols., Edinburgh 1876–80); Beveridge, W., 'Makers of the Scottish Church' (New York 1908).

CULEBRA, koo-lā-brā, **ISLAND.** See VIRGIN ISLANDS.

CULEX, a short pastoral poem of 414 hexameter lines in Latin, dealing with a goatherd who is awakened by the sting of a gnat, which he kills only to find that the gnat had saved his life by awakening him in time to flee from a snake. At night the shade of the gnat reproaches the goatherd for his base ingratitude and the latter in atonement erects a tomb and performs the customary funeral rites for the gnat. Modern scholars disagree with the ancients who ascribe such a poem to Virgil. Consult Jackson, 'The Authorship of the Culex' (in the *Classical Quarterly*, Vol. V, 1911).

CULIACÁN ROSALES, koo'-lyȧ-kän' rō-zäl'ēs, Mexico, capital of the state of Sinaloa, and chief town of the district of Culiacán. It is situated about 887 miles from the city of Mexico, and is an important commercial centre, with fine public buildings, including a cathedral, government palace, and mint. It is an episcopal see. A railroad 37 miles long connects it with the seaport town of Altata. It has cotton-mills and other industrial establishments. It was founded in 1599 with the name San Miguel. Pop. 13,527.

CULICIDÆ, kū-lĭs'ĭ-dē, the mosquitoes (q.v.), a family of nematocerous diptera.

CULILAWAN, kōō''lē-lă'wăn, **BARK**, the aromatic pungent bark of the *Cinnamomum culilawan,* a tree of the Moluccas; useful in indigestion, diarrhœa, etc. Called also clove-bark.

CULIN, Stewart, American anthropologist: b. Philadelphia, Pa., 13 July 1858. He was educated at a Friends' School and afterward at Nazareth Hall. Leaving this school at the age of 17, he engaged in business, but was soon persuaded to take up anthropological research. In 1883 he became secretary of the Numismatic and Antiquarian Society of Philadelphia and began a study of the Chinese in America, and wrote a report on their games. He made numerous scientific expeditions to Korea, Japan, China and India and among American Indian tribes. He became curator of the Museum of Science and Art of the University of Pennsylvania in 1889, and one of the foremost anthropologists of America. In 1892 he was appointed director of the Museum. In this capacity he represented Pennsylvania University at the Colombian Historical Exposition in Madrid, where he was at the same time secretary of the United States Commission. In 1888 he organized the Oriental Club in Philadelphia; in 1897 he became president of the American Folk-Lore Society; and vice-president of the anthropology section of the American Association in 1901. He has been elected honorary member of the Swedish Spanish, Italian and Mexican Anthropological Societies. He has written 'Korean Games' (1896); 'Mancala, the National Game of Africa' (1894); 'American Indian Games' (1905).

CULINARY. See COOKERY.

CULLEN, Paul, CARDINAL, Irish Roman Catholic prelate: b. near Ballytore, County Kildare, 27 April 1803; d. Dublin, 24 Oct. 1878. He was ordained priest in 1829, and filled in succession the offices of vice-rector and rector of the Irish College in Rome, and rector of the Propaganda College. During the period of Mazzini's power in Rome in 1848, Cullen saved the property of his college by placing it under American protection. At the close of 1849 he unexpectedly found himself nominated to the archbishopric of Armagh and primacy of Ireland. His vigorous denunciations of Fenianism made him many enemies. He also forbade the clergy to take an active part in politics, and advocated papal infallibility. At the Synod of Thurles in 1851, principally by Cullen's persuasion, the establishment of a Roman Catholic university in Ireland was recommended, but his quarrel with Dr. Newman, its head, wrecked the scheme. Translated to Dublin in 1852, he was created a cardinal priest in 1866, the first Irishman who had reached that rank. One of the majority at the Vatican council, he long enjoyed the familiar friendship of Pope Pius IX.

CULLERA, koo-lyā'rą, Spain, a fortified town in the province of Valencia, and 25 miles south by east of Valencia, on the Júcar River near its entrance into the Mediterranean. Its natural position makes it a place of military importance, and though its fortifications have been repeatedly dismantled, they are now in an efficient state. Its streets are irregular but level, and among the noteworthy features are a ruined castle and the chapel of the Virgen de Cullera. Fishing, agriculture and stock raising are the principal industries. The city is the centre of a considerable trade in grain, rice, oranges, wine, etc. Cullera was of great military importance under the Moors, by whom it was strongly fortified, and successfully withstood attacks of the Christian armies in 1234 and 1235, though later it was taken by James I of Aragon. Pop. 13,556.

CULLODEN, or **DRUMMOSSIE MOOR,** a heath in Scotland, four miles east of Inverness. It is celebrated for a victory obtained 27 April 1746, by the Duke of Cumberland over Prince Charles Edward Stuart (the Pretender) and his adherents. The battle of Culloden was the last battle fought on British soil, and the termination of the attempts of the Stuart family to recover the throne of England. A monumental cairn and green mounds have been raised where the fiercest of the fight raged, and where many of the slain are buried. The *Culloden Papers* were discovered at Culloden House, the family seat of Duncan Forbes a mile to the north. They cover the years 1625–1748, and were published in London in 1815. Consult William Augustus, Duke of Cumberland, 'Authentic Account of the Battle of Culloden' (London 1746).

CULLOM, Shelby Moore, American senator: b. Wayne County, Ky., 22 Nov. 1829; d. 28 Jan. 1914. In 1853 he went to Springfield, Ill., to study law, was admitted to the bar and settled in practice there. He was in the Illinois House of Representatives 1856, 1860, 1872, 1874, and its speaker in 1861 and 1873. He was elected to Congress 1865–71. At the Republican national convention, 1872, he nominated Gen. U. S. Grant. He was governor of Illinois 1877–83, when he was elected to the United States Senate, and re-elected 1888, 1894, 1900 and 1907. He was chairman of the Senate committee which reported the Interstate Commerce Bill, and a member of the commission appointed to prepare a system of laws for the Hawaiian Islands. His report on the regulation of railroad corporations by national legislation, presented to the Senate, 18 Jan. 1886, has taken its place as a permanent contribution to economic literature. He wrote 'Fifty Years of Public Service' (Chicago 1911).

CULLUM, George Washington, American military officer: b. New York, 25 Feb. 1809; d. there, 28 Feb. 1892. He was graduated from West Point in 1833; and was engaged for the next 28 years in engineering labors and in instructing at West Point in practical military engineering. During the Civil War he was chief of staff to the general-in-chief 1861–64, and superintendent of the Military Acadamy 1864–66. He was made chief engineer of the Department of the Missouri in 1861, superintended engineering work on the Western rivers and was chief engineer at the siege of Corinth. From that time he was a member of the board of engineers for fortifications, until he was placed on the retired list in 1874. At the time of his retirement he was colonel and brevet major-general in the regular army. Besides numerous military memoirs and reports, he published 'Military Bridges with India-rubber Pontoons' (1849); 'Register of Officers of the U. S. Military Academy from 1802 to 1850' (1850); a translation of Duparc's 'Elements of Military Art and History,' with notes, etc. (1863); a 'Biographical Register of the Officers and Graduates of the U. S. Military Academy' (1868) (revised edition 1879); 'Campaigns of the War of 1812 Criticised' (1880). He bequeathed $250,000 for the erection of a memorial hall on the grounds of the Military Academy, and $40,000 for furnishing it with military busts, paintings and other appropriate objects and for the continuance of his 'Biographical Register.'

CULM, a term used in the United States to designate waste anthracite coal, but in some parts of England for anthracite in general. At one time disposal of the culm heaps surrounding the shafts of the mines in Pennsylvania became a serious problem, until its use as fuel was made possible, either by burning it in special grates, or by pressing it into briquettes (q.v.). In England the culm is sometimes made up into balls, with one-third of its bulk of wet clay. This mixture burns without flame, and gives a steady heat suitable for cooking. In botany culm is the straw or hollow stem of the grasses.

CULMINATION, an astronomical term, signifying the passage of a star across the meridian. The star is then at the highest point (*culmen*) of its course; hence the name. The sun culminates at mid-day, or 12 o'clock, apparent solar time — which seldom agrees exactly with mean time, as shown by a watch or clock. The full moon culminates at midnight. The term is interchangeable with transit.

CULP, Julia, Dutch contralto singer: b. Groningen, 6 Oct. 1881. Her earliest musical education was on the violin, and in this study she acquired such proficiency that she made several successful tours in her native country. When 14 years of age she abandoned the violin and undertook voice-culture at Amsterdam and Berlin. In 1901 she made her début as a singer at Madgeburg in a concert with Busoni. She at once established her reputation as a "lieder singer" and added to her fame during her subsequent tours of Austria, Belgium, France, Italy, Spain and Russia. By 1913 she had become the foremost lieder singer in the world and in that year visited America. She returned the following year and appeared in numerous recitals with great success. She possesses a remarkable voice of which she is at all times perfect master. To this as well as her musical knowledge is due her pre-eminence as a lieder singer.

CULPEPPER, John, English colonial leader in the provinces of North and South Carolina. He was a refugee from the southern or Clarendon colony, and in 1678 was the head of an insurrection in the northern or Albemarle colony in favor of popular liberty. The insurgents later sent Culpepper to England to negotiate a compromise. He was indicted for high treason, but through the influence of Shaftesbury was acquitted on the ground that no regular government had existed in Albemarle. He returned to Carolina, and in 1680 laid out the city of Charleston, reducing the paths, streets and squares to comparative regularity, and enclosing the town site with a line of fortifications.

CULPEPPER, or COLEPEPPER, Thomas, American royal governor: b. England; d. there 1719. He was one of King Charles II's favorites, who received from that monarch a grant of the entire territory of Virginia for a period of 31 years from 1673, a grant so astounding in character that, in the opinion of at least one historian, nothing but the very deed itself, still extant, could be accepted as evidence of the fact. He was governor of Virginia 1682–83, and two years later relinquished most of his Virginia grant, retaining only a portion called Northern Neck, and securing, instead of the remainder, an annual pension of £600 for 20 years. His whole career was actuated by the meanest rapacity, an example of which may be seen in his trying to swindle the colonists by paying the public wages in light coin, on which he had himself put an arbitrary value. In 1683 he returned to England, was tried and convicted of corruption and deprived of his commission. His daughter Catherine married Baron Fairfax to whom the great estate descended. Consult Doyle, 'English Colonies in America' (Vol. I, 1882).

CULPER, local name in Africa for a fish resembling a perch, but of uncertain classification, which inhabits the Zambesi Valley. It burrows in the mud and thus survives droughts, and is exhumed both by animals and the native negroes for food, but is not thought palatable by the white colonists.

CULPRIT FAY, The, a poem by Joseph Rodman Drake (q.v.). It relates the love of a fairy for a mortal, and the punishment of the offense.

CULVERIN, in early times, any small gun, the name being derived from the serpent-shaped handles cast on the piece. In the 16th century and later the name was used with reference to the heavier cannon, like the 18-pounder. Variations of the name were whole culver or culver, referring to the heavier guns, demi-culverin to the smaller.

CULVERT, an artificial channel for carrying a small stream underneath a canal or the embankment of a roadway or railway. For very small streams vitrified clay pipe or cast-iron pipe is used for culverts. For streams of larger size stone box culverts are employed, consisting of two parallel masonry walls covered over with stone flagging and having a paved bottom. Where stone is scarce, box culverts are sometimes built of timber, and sometimes, instead of stone flagging, a roof of iron beams embedded in a concrete slab is employed. Large culverts are usually built with parallel masonry side walls, supporting a stone or brick roof arch. With the increased use of concrete in railway engineering this material is increasingly used, both in the form of plain arches and various forms of reinforced concrete structures. A culvert, besides the passageway for the water, has wing walls at one or both ends to hold the embankment in place and protect it from the rush of the flowing water in times of freshet. For full technical description of culvert construction consult Baker, 'Treatise on Masonry Construction' (10th ed., New York 1912); and also in 'American Railway Engineering and Maintenance of Ways, Bulletin 105' (Chicago 1908); and Merriman, 'American Civil Engineer's Pocket-Book' (2d ed., New York 1913).

CUMÆ, kū'mē, a very ancient city in Campania, and the oldest colony of the Greeks in Italy was founded about 1030 B.C., according to ancient authorities, by colonists from Chalcis in Eubœa and from Cyme in Asia Minor. Strabo tells us that it was the oldest of all Greek settlements in either Italy or Sicily. They soon spread out, and founded Zancle in Sicily (better known as Messina), and Naples. Its wealth and prowess invited a joint attack in 524 B.C. by the Etruscans of Capua, the Daunians of Nola and the Aurunci of Mons Massicus, which resulted in a victory for Cumæ. In 420 B.C., Cumæ was taken by the Campians and became Oscan in character. With the Campians, it came under the power of Rome (345 B.C.) and lost its identity. During the Second Punic War, it resisted the attacks of Hannibal. Thenceforth it remained a quiet suburb where the politicians of Rome had their villas. Its strong fortifications made it an important military factor, but it was finally destroyed by the Neapolitans in 1205 A.D. All that remains of the city are some ruins of an amphitheatre, of a small temple and masses of masonry, evidently of Roman construction. Considerable remains of the ancient fortifications are visible, and underneath the Acropolis are numerous crypts. The common belief of the inhabitants made Cumæ the home of the Cumæan sibyl, a most renowned ancient prophetess; and one of these caverns was supposedly her seat. The extensive cemeteries of the city have proved of great interest to archæologists who have unearthed Greek, Samite and Roman graves and many important objects, which establish the fact that some sort of pre-Greek settlement existed there. Consult Beloch, J., 'Campanien' (Breslau 1890); Pellegrini, G., 'Monumenti dei Lincei' (Vol. XIII, 1903); Patroni, G., 'Atti del congresso di scienze storiche' (Vol. V, 1904).

CUMANA, koo-mä-nä', Venezuela, capital of the new state of Sucre, which formerly constituted a section of the state of Bermúdez. It was founded by Gonzáles Ocampo in 1520, under the name of Nueva Toledo, and near Nueva Cordoba, founded in 1523 by Jácomo Castellón. It is situated on the banks of the Manzanares River, one mile from the southern coast of the Gulf of Cariaco. The city is celebrated as being the first permanent settlement of Europeans on that coast. Being situated on ground of volcanic formation, the city is subject to frequent earthquakes. The surrounding country is fertile, producing especially fine grapes, pineapples and other fruits, and such tropical plants as coffee and cacao. A railroad connects the city with the gulf. It has a college and is the seat of a United States consular agent. It is an important commercial centre, its trade being promoted by an excellent roadstead and harbor, which are dominated by the fort of San Antonio on a hill overlooking the town. The exports are cacao, sugar, coconuts, tobacco, pearls and hides. The suburbs of San Francisco, Guayquerias and Serritos have an aggregate population equal to that of Cumana, which has 12,225 inhabitants.

CUMARIN. See COUMARIN.

CUMBERLAND, Richard, English dramatist and essayist: b. Cambridge, 19 Feb. 1732; d. Tunbridge Wells, 7 May 1811. He was graduated at Trinity College, Cambridge, in 1750, and two years afterward was elected Fellow. He was appointed private secretary to the Earl of Halifax, became Ulster secretary during Halifax's term as lord lieutenant of Ireland. In 1775 he obtained a post in the Board of Trade and retired to Tunbridge Wells, where he devoted himself to literature. His comedies, 'The West Indian'; 'The Wheel of Fortune'; 'The Jew' and 'The Fashionable Lover,' are an epitome of the culture of the time; as are his essays, collected under the title of 'The Observer.' He wrote novels, tracts, religious and didactic poems, not now important; 'Anecdotes of Eminent Painters in Spain.' His plays, though popular in their day, have not survived. His 'Memoirs' appeared in 1807, but are considered untrustworthy. Consult Paston, George, 'Little Memoirs of the Eighteenth Century' (London 1901).

CUMBERLAND, England, the extreme northwest county. It has 75 miles of coast and an area of 1,520 square miles. A little more than half of the county is cultivated, the rest is covered by mountain and lake. The highest peaks of the Cumbrian Mountains are in the lake region, whence valleys radiate in all directions, gradually ending in a flat coastal belt. The chief rivers are the Eden and Derwent. Mineral wealth abounds, chiefly coal, iron and lead. Dairy farming and domestic manufactures are carried on. The chief towns are Carlisle, the capital, Whitehaven, Brampton, Workington, Maryport and Millom. Consult Ferguson, 'History of Cumberland' (London 1890) and Wilson (editor), 'The Victoria History of Cumberland' (Westminster 1901). Pop. 265,780.

CUMBERLAND, Md., city and the county-seat of Allegany County, 150 miles southeast of Pittsburgh; 178 miles northwest of Baltimore; 152 miles northwest of Washington, D. C., is picturesquely located on the Potomac River, 632 feet above tide water. It is also on the main line of the Baltimore and Ohio Railroad, the Western Maryland Railway, the Pennsylvania Railroad and other interurban railways and is at the head waters of the Chesapeake and Ohio Canal, which extends thence to Georgetown, D. C. Cumberland is situated 11 miles from the noted Cumberland and George's Creek bituminous coal regions and is the shipping point for large quantities of this coal, considered the finest in the world for steaming purposes. Its manufactures are also considerable; they include large glass works, brick works, cement works, steel works, iron foundries, dye works, tanneries and numerous other enterprises. Here are located large rolling mills for the rerolling of steel rails and other materials of railway supplies, as well as large railway car and repair shops, and large capital is invested in mercantile interests. Fort Cumberland was built in the winter of the years 1754–55 at the beginning of the French and Indian War; on the site of the fort, Cumberland was laid out in 1785. It was incorporated in 1815 and became a city in 1850. The government of Cumberland is now by commission, composed of a mayor and four councilmen. This was the first city in Maryland to adopt this form. The proximity of Cumberland to Pittsburgh, Baltimore and Washington led to much speculation as to the influence which this radical step would have on the government of those cities. Yet after six years' experience in which many important undertakings were carried to a successful conclusion, such as a new gravity water supply, costing $750,000 which furnishes abundance of the purest drinking water in the world to its entire population. A new sewerage and conduit system, paving of over 40 miles of street without any appreciable raise in tax rate has proven this form a success in this instance. Pop. 29,000.

CUMBERLAND, R. I., town in Providence County, six miles north of the city of Providence, on the New York, New Haven and Hartford Railroad and on the Blackstone River. It has extensive manufactures of cotton goods, silk, clothes, horseshoes and iron ware, and in the vicinity are valuable granite quarries, and the «mineral pocket of New England,» containing deposits of coal, iron, copper and gold. Among its buildings and historic points of interest are the Elder Ballou Meeting House, built about 1740; the Catholic (non-sectarian) Association Institute; the Cistercian Trappist monastery; the grave of William Blackstone, the first white settler in Rhode Island, who built «Study Hall» as a residence about 1635; and the Nine Men's Misery cairn, the graves of nine victims of early Indian wars. Named after William Augustus, Duke of Cumberland, the town was incorporated in 1747. Pop. 10,107.

CUMBERLAND, Army of the, in the American Civil War, a name applied to one of the principal Federal armies, which prior to 30 Oct. 1862, had been known as the Army of the Ohio. On this date Gen. W. S. Rosecrans assumed command and a new army of the Ohio was formed. The Army of the Cumberland continued under the command of General Rosecrans until October 1863, when Gen. George H. Thomas became commander. At the beginning of 1864 the 11th and 12th corps, which had been added in 1863, were consolidated into the 20th corps.

CUMBERLAND GAP, on the dividing line of Virginia and Kentucky on the north, and Tennessee on the south, is the main gateway of the Cumberland Mountains, between eastern Kentucky and East Tennessee. Early in the Civil War it was occupied by the Confederates and remained in their possession until 18 June 1862, when, in view of a concentration of the Confederates at Chattanooga, which was threatened by the advance of Gen. O. M. Mitchell from Huntsville and Bridgeport, Ala., it was evacuated, and was occupied by Gen. Geo. W. Morgan, who, with a division of 8,000 men, had been operating against it for nearly two months. Morgan fortified it, established magazines and an arsenal, from which thousands of arms, with ammunition, were distributed to the Union men of East Tennessee, and remained in possession until 17 Sept. 1862. Then Gen. E. Kirby Smith, having crossed the mountains south and defeated General Nelson at Richmond, Ky. (29 and 30 August), thus cutting off communication from the north, while Gen. C. L. Stevenson with a division of 9,000 men was pressing him in front, Morgan, short of provisions and forage, and not prepared for a siege, blew up his arsenal and magazines, set fire to his storehouses, and at night, 17 September, started on a march of 200 miles through an almost unbroken wilderness to Greenup, on the Ohio River. He reached there 3 October without the loss of a gun or a wagon, and with the loss of only 80 men, although pursued some distance by Stevenson, and harassed much of the way by Morgan's cavalry. Bragg retreated through the Gap, after the failure of his Kentucky campaign, and it remained in Confederate possession a year. General Burnside entered Knoxville, 3 Sept. 1863, and finding the Gap occupied by Gen. John W. Frazer, with a brigade of 2,300 men, ordered General Shackleford with a cavalry brigade to approach it from the south and co-operate with Colonel DeCourcy, who, with a division of new troops, had been ordered to march on it from the north. Shackleford reached the south end of the Gap on the 7th and communicated with De Courcy, who had arrived on the north side, and both summoned Frazer to surrender, who refused. Burnside led an infantry brigade from Knoxville, joined Shackleford on the morning of the 9th and at his demand Frazer surrendered his force of over 2,000 men, with 12 guns and a large supply of ammunition. The Gap remained in Union possession to the close of the war. Consult 'Official Records,' (Vol. XXX); The Century Company's 'Battles and Leaders of the Civil War' (Vol. III).

E. A. Carman.

CUMBERLAND MOUNTAINS, or **CUMBERLAND PLATEAU,** that portion of the Appalachian group which ranges along the southwest border of Virginia and the southeast of Kentucky, and passes across the State of Tennessee into the northeastern part of Alabama. The region is bounded on the east by a bold escarpment overlying the Great, or Appalachian Valley. On the east, next to the escarpment, the rocks are somewhat folded, but farther west the sediments are practically flat, and the area is more truly a deeply dissected plateau than a definite range of mountains. The region is also bounded on the west by a less marked escarpment. The ridges are rocky and little cultivated, but the valleys are fertile. These mountains lie west of the range of the granite and metamorphic rocks, which compose the mountains on the western borders of North Carolina and the northern part of Georgia. They are upon the range of the great coal formation of the Middle States, and essentially composed of the same groups of stratified rocks as those of the Alleghany Mountains, Chestnut Ridge and Laurel Hill in Pennsylvania. The Tennessee River and its branches drain a portion of the eastern slope.

CUMBERLAND PRESBYTERIANS. See Presbyterianism.

CUMBERLAND RIVER, river of Kentucky and Tennessee, rising in the Cumberland plateau, in eastern Kentucky, near the Virginia line. It flows at first generally northwest and then southwest through southern Kentucky and enters Tennessee in long. 85° 30′ west. It then flows, in a very tortuous course, southwest, west and then generally northwest, through northern Tennessee, re-entering Kentucky nearly at 88° west. From this point it approximately parallels the Tennessee River, to its confluence with the Ohio River at Smithland, about 12 miles east of Paducah, Ky. Its total length is 688 miles, and its basin area is about 18,000 square miles. It is navigable for steamboats to Nashville, 193 miles, and for vessels of three-feet draught 325 miles farther, to Burnside, Ky., which is commonly considered the head of navigation.

CUMBERLAND ROAD, The, or **GREAT NATIONAL PIKE,** originally, a road planned from the Maryland frontier at Cumberland, Md., to connect with the State roads and run to Saint Louis (then just fallen into United States hands by the Louisiana Purchase); to open up the West to immigrants, and provide for military and postal transportation. It was to be built at national expense from the sales of public lands, as a fair counterpoise to the seaboard States' ability to pay their expenses by levying customs duties; and pushed forward by sections as settlement advanced. Henry Clay was its most conspicuous projector and advocate, and a monument to commemorate his services to it has been erected on its course near Wheeling, W. Va. The bill for the first section passed Congress, 29 March 1806; it authorized the President (Jefferson) to appoint three commissioners to lay out the road from Cumberland to the Ohio River (Wheeling), and appropriated $30,000 for expenses. At the same time another was passed to lay out one through Georgia, on the New Orleans route; and others followed in swift succession for two decades. This policy of roads, soon supplemented by canals, became the great battle-ground for the strict-construction party, who fought the whole policy of internal improvements as unconstitutional; and the Cumberland Road with its constant call for improvements and repairs aroused ever fresh resistance. Finally in 1822, Monroe, although he had signed two annual bills of the kind, vetoed a third; and for the time the improvements and new roads came to a standstill. With John Quincy Adams, who was in thorough sympathy with Clay's policy, as with every other to increase the national wealth and power, the system started up afresh; and the Cumberland Road was pushed forward through Ohio and Indiana. On the accession of Jackson, a strict-constructionist, the vetoes began and the roads stopped; with Van Buren the latter commenced again, and by 1840 the road had advanced to Vandalia, Ill. By this time the railroads had become so decisively the coming transportation system that no more was built; the last act in its favor was passed 25 May 1838. It was admirably constructed, macadamized, with stone bridges and iron mileposts and toll-gates; and the total amount expended on it by the United States was $6,821,246. The name "Cumberland Road" in current use was extended to take in the section from Cumberland through Frederick to Baltimore, built largely by Maryland banks, which were rechartered in 1816 on condition of completing it. It was a most profitable speculation, the tolls yielding them sometimes as high as 20 per cent, though finally sinking to 2 or 3 per cent. The portion built by the national government was acquired in 1878 by the counties of Alleghany and Garrett, which made it a free road. The whole road from Baltimore to Vandalia is about 800 miles long. Consult Hulbert, 'The Cumberland Road' (1903); Rideing, 'The Old National Pike' (*Harper's Magazine,* Vol. LIX, 1879).

CUMBERLAND UNIVERSITY, coeducational institution located at Lebanon, Tenn. It was first opened to students in September 1842, and a charter was procured in December 1843. As at first organized, the University was composed of a College of Liberal Arts and a Preparatory School. The Law School was opened in 1847. Its growth from the start was remarkable, and in 1858 it was considered the second in size among the law schools of the country. The Theological School was established in 1852, but was discontinued in 1909. The School of Engineering was established in 1852, and the School of Music in 1903. When the Civil War began the university had 481 students, buildings and apparatus valued at $50,000, and an endowment of $100,000. During the war the buildings were burned, apparatus and library were destroyed, the endowment rendered worthless. In January 1866, the

University was reopened without buildings, endowment or apparatus. Since that time it has had a steady growth; its buildings are large and commodious; its libraries, general and departmental, number 20,000 volumes. Since 1897 it has been a coeducational institution. The total enrolment in 1915 was 416 students, and there were 28 instructors. The buildings and land of the university together with furnishings and equipment are valued at $247,000 and the productive endowment is $90,000. The institution is under the auspices of the Presbyterian Church.

CUMBRIAN MOUNTAINS, a range of mountains, England, occupying part of the counties of Cumberland, Westmoreland and North Lancashire, about 37 miles long and 35 miles broad. The mountains rise with steep acclivities, enclosing in some parts narrow but well-cultivated valleys, with numerous picturesque lakes, this being the English «Lake Country,» so much frequented by tourists. There are 25 mountain tops upward of 1,500 feet high, the highest being Scafell Pike, which measures 3,210 feet and is the loftiest peak in England. The deep valleys between the mountains contain 14 lakes, 1 to 10 miles long. The largest is Windermere. Many eminent persons have lived in this district, among them Wordsworth, Southey, Coleridge, De Quincey, Arnold and Harriet Martineau. The heavy rainfall of the region is utilized by the conversion of one of the lakes Thirlmere, into a reservoir for the water supply of Manchester.

CUMIN, kŭm'ĭn, **Oil of,** the expressed product of a long-known umbelliferous plant, grown in Egypt and Ethiopia, and largely cultivated in Sicily and Malta, whence it is brought to this country. Cumin seeds, when distilled with water, yield a pale-yellow limpid oil of disagreeable odor and harsh taste, consisting of an oil called cuminol, hydride of cumyl, or cuminic aldehyde ($C_{10}H_{12}O$), and cymene or cymol ($C_{10}H_{14}$). Cymene is methyl-isopropyl benzol. Cuminol and cymol can only be partially separated by distillation, cymol being the more volatile, but cuminol is better removed by causing it to combine with hydropotassic sulphite. When pure, cuminol is a colorless liquid, lighter than water, boiling about 446° F. The other constituent, cymol ($C_{10}H_{14}$), is a colorless, strongly refracting, lemon-smelling fluid, which has a specific gravity of 0.85, and boils about 347° F. It is insoluble in water, but dissolves in alcohol, ether and oils.

CUMINUM, cū'mĭn-ŭm, the fruit of *Cuminum cyminum,* an umbelliferous plant closely related to caraway, with which it is allied in properties and uses. See Cumin, Oil of.

CUMMING, Alfred, American territorial governor: b. Augusta, Ga., 1802; d. 1873. When the Mormons under Brigham Young disputed the authority of the Federal government, President Buchanan, in 1857, sent Cumming to Utah as governor with a force of 2,500 men. He at once declared the territory to be in a state of revolt, to which Young replied by a proclamation forbidding the army to enter the territory. It was not until 1858 that Cumming regularly assumed office, in which he was supported by the troops for nearly two years. Cumming held the position until 1861. See Utah, *History.*

CUMMINGS, Amos Jay, American journalist: b. Conkling, N. Y., 15 May 1841; d. Baltimore, Md., 2 May 1902. At the age of 12 he entered a printing office as an apprentice, and was accustomed to say that he had set type in nearly every State in the Union. He was with Walker in the last invasion of Nicaragua; was a sergeant-major in the 26th New Jersey Infantry during the Civil War; and received the congressional medal of honor for gallantry on the battlefield. In 1863 he entered the service of the New York *Tribune* under Greeley, and later was on the staff of the New York *Express* and the *Sun* successively. From 1887 until his death he was a Democratic representative in Congress from New York city districts. He was the author of a series of letters, which attracted much attention, written from Florida and California to the *Sun,* over the signature «Ziska.»

CUMMINGS, Charles Amos, American architect: b. Boston, 26 June 1833; d. 1905. He was educated in the Boston schools and at the Rensselaer Polytechnic Institute, Troy, N. Y., and till his retirement practised his profession in his native city. He published a valuable 'History of Architecture in Italy from the Time of Constantine to the Dawn of the Renaissance' (1901), and collaborated with W. P. P. Longfellow (q.v.) in 'A Cyclopædia of Works of Architecture in Greece, Italy and the Levant' (1897).

CUMMINGS, Thomas Seir, American miniature painter: b. Bath, England, 1804; d. Hackensack, N. J., 1894. He came to New York early in life and studied there with Henry Inman. He painted miniatures in water color, and many of his sitters were well-known contemporaries of the artist. In 1826 he helped to found the National Academy of Design, was its treasurer for many years and one of its early vice-presidents. He also wrote an account of its history, entitled 'Historic Annals of the National Academy from its Foundation to 1865' (Philadelphia 1865). His later life was spent in Connecticut and Hackensack, N. J.

CUMMINS, Albert Baird, American lawyer and statesman: b. Carmichaels, Pa., 15 Feb. 1850. He received an academic education at Waynesburg, Pa., was admitted to bar and settled in practice at Des Moines, Iowa. The honorary degree of LL.D. was conferred on him by Waynesburg College in 1903 and by Cornell College, Iowa, in 1904. From 1896 to 1900 he was a member of the Republican National Committee, in 1901 was elected governor of Iowa, in 1903 was re-elected and, again for his third term in 1906. In 1908 he was elected to the United States Senate to fill the vacancy caused by the death of Senator William Boyd Allison, and was re-elected for the terms 1909–15 and 1915–21. While governor of Iowa he made a thorough study of matters relating to the regulation of railroad and other corporations, and to him was largely due the passage by the Senate of various important measures relating to trusts and railroads.

CUMMINS, George David, American clergyman: b. Kent County, Del., 11 Dec. 1822; d. Lutherville, Md., 26 June 1876. He was graduated at Dickinson College, Pa., 1841; ordained to the Episcopal ministry, 6 July 1847, and was successively rector at Norfolk, Va., Richmond, Va., Washington, D. C., Baltimore, Md., and Chicago, Ill., until consecrated assistant bishop of Kentucky, 15 Nov. 1866. In November 1873 he resigned his office and withdrew from the Church, preliminary to taking steps to form a new sect, "The Reformed Episcopal Church," of which he was made the presiding bishop December 1873. He was formally deposed from the Protestant Episcopal ministry, 24 June 1874. See REFORMED EPISCOPAL CHURCH. Consult the 'Memoir' by his wife (New York 1878).

CUMMINS, Maria Susanna, American novelist: b. Salem, Mass., 9 April 1827; d. Dorchester, Mass., 1 Oct. 1866. Her novel, 'The Lamplighter' (1853) had enormous success and was translated into foreign languages; it is still remembered for the idyllic charm and tenderness of its first few chapters, but the rest is commonplace. Her other books are 'Mabel Vaughn' (1857); 'El Fureidis' (1860); 'Haunted Hearts' (1863).

CUMNOR HALL, a ruined manor house near Oxford, England, the "Cumnor Place" of Scott's 'Kenilworth.' Meikle's musical ballad of 'Cumnor Hall,' a lament for Amy Robsart, furnished Scott, as is supposed, with the motive of 'Kenilworth.'

CUMONT, kü'môṅ', **Franz Valery Marie,** Belgian Orientalist: b. Alost, East Flanders, 3 Jan. 1868. He studied at the universities of Ghent, Bonn, Berlin, Vienna and Paris; from 1892 to 1910 he was professor in the University of Ghent, and from 1899 to 1912 curator of the Royal Museum at Brussels. In 1913 he was made an associate of the French Academy of Inscriptions. He was Hibbert lecturer at Oxford in 1901 and 1906. His principal works are on the Eastern cults that took root in Rome about the beginning of the Christian era: they include 'Textes et monuments relatifs aux myseres de Mithra' (1894–1901), translated as 'The Mysteries of Mithras' by McCormack (Chicago and London 1903); 'Catalogus Codicum Astrologorum Græcorum' (1898 et seq.); 'Studia Pontica' (1901–11, with Anderson); 'Les religions orientales dans le paganisme romain' (1906; 2d ed., 1909; Eng. trans., 1911); 'Recherches sur le Manichéisme' (1908–12); 'Astrology and Religion in Antiquity' (1912).

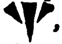
CUMULATIVE VOTING, the system by which every voter is entitled to as many votes as there are persons to be elected, and may give them all to one candidate, or may distribute them among the candidates, as he thinks fit. The practice was first introduced into Great Britain in 1870, and used in the election of school boards, and later in parliamentary elections. Although the general adoption of the system has been urged as a desirable reform it has not had much success. The States of Illinois and Michigan have used the method in some elections, and its legality was questioned. The Supreme Court of the latter State declared it constitutional. See MINORITY AND PROPORTIONAL REPRESENTATION.

CUNARD, SIR **Samuel,** English ship-owner: b. Halifax, Nova Scotia, 21 Nov. 1787; d. London, 28 April 1865. Becoming early a successful merchant and ship-owner, he went to England in 1838, and joined with George Burns and David M'Iver in founding (1839) the British and North American Royal Mail Steam Packet Company. The first passage was that of the *Britannia* in 1840. This small venture developed into the present great commercial enterprise known as the Cunard line of ocean steamers plying between England and America. He was knighted in 1859.

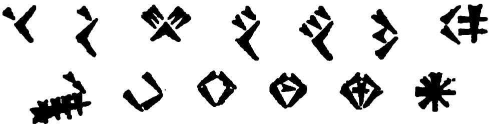
CUNAXA, kų-năks'ạ, Mesopotamia, east of the Euphrates, about 60 miles north of the site of the ancient city of Babylon. Famous in history for the defeat of the younger Cyrus, 401 B.C. See XENOPHON.

CUNDINAMARCA, koon-de-nä-mär'-kä, Colombia, a department once of extensive area, but now reduced with ill-defined boundaries to about 8,046 square miles. It consists of an elevated plateau transversed by the eastern Cordillera of the Andes, and cut by many rivers. Its capital is Bogotá, also the capital of the republic. Its soil is fertile and tobacco is extensively cultivated. It is also rich in minerals and good grazing country. Pop. 713,968.

CUNDURANGO, kŭn-dŭ-răn'gō, the bark and wood of a vine growing in Ecuador, South America, supposed at one time to be a specific for cancer.

CUNEIFORM WRITING is so called because its characters consist of strokes of the shape of a wedge (Latin, *cuneus*); and for a like reason it is also known as arrow-headed but less widely; it is a mode of writing used in early times, and till the downfall of the Babylonian and Assyrian empires, in the region of the Euphrates and Tigris and in contiguous countries northward and eastward of those empires, as Armenia, Persia, Media, Susiana. It was an outgrowth of a primitive hieroglyphy most probably originating among the peoples of that part of western Asia and not derived from Egypt. For an account of the archæological researches in Babylonia and Assyria see the article BABYLONIA, where the invention of cuneiform writing is credited to the Accadian population of Chaldæa, from whom it passed to a Semitic people, their conquerors, later known as Babylonians and Assyrians. Before the conquest the cuneiform writing of the Accadians had been adapted by them not only to ideographic representation — representation of objects or notions, as the sign $ denotes dollar or as in astronomy the trident stands for the planet Neptune — but also to representation of sounds. This was a step in the direction of alphabetic writing, but the cuneiform system never reached that development, and its highest achievement was the production of a syllabary — a catalogue of the syllables of the language. The transition from the ideographic to the phonetic use was a long step toward perfection as it immensely simplified the problem of writing by reducing to a comparatively small number of different characters the infinity of emblems required for ideographic representation. It was as though a sign, as , originally, let us suppose, the ideograph for tree, were made to stand for the syllable ta, to, etc.: in that case all words beginning with the syllable ta or to would be represented by a form of expression having that sign for its first element, and not by an independent arbitrary form.

The cuneiform writings found among the ruins of the Assyrian, Babylonian and other ancient cities of western Asia were either impressed with a stylus on tablets of moist clay then kiln-baked or were incised with a chisel on monuments of stone. The wedge either stands upright, or inclined at an angle, or lies horizontal, or two wedges form an angle coming together at their points, or at their bases. A few examples will give an idea of the manner of combining them for the expression of ideas:



In its stage of highest development the cuneiform writing was exceedingly complex and clumsy, and the fact that it was made to serve so well as it did the needs of the Babylonians and Assyrians as a means of literary expression, as the vehicle of laws and as a means of historical record, gives striking demonstration of man's invincible effort to develop his intellectual and moral powers. It was a very simple thing to make the ideograph speak to the ear as well as to the eye — to represent, for example, the sun (utu) by an ideograph and then to make that symbol stand for the syllable ut in all situations; but it was a beginning, and out of it was constructed as efficient a mechanism as was allowed by the refractoriness of the material of construction. But the cuneiform writing never gave any indications of a tendency toward an alphabetic system.

The results of archæological exploration in those countries of western Asia are justly regarded as among the most valuable of modern historical research. They put us in possession of much of the literature and early history of peoples whose record seemed already lost past recovery as far back as the time of Herodotus (5th century B.C.) or at least of Berosus (3d century B.C.) of whose writings only some fragments have come down to us: our knowledge of the history of those great empires, beyond a few incidental notices in the Bible, was drawn mainly or wholly from those two historians; but now, thanks to the researches of our contemporaries, we have with regard to many points of Assyrian and Babylonian history fuller and more authentic information than we possess regarding the history of ancient Greece and Rome.

No one document of the thousands that have been unearthed in the course of those explorations surpasses or even equals in interest the code of King Khammurabi (the Amraphel of Genesis xiv, 9, «King of Shinar» or Elam, called also in the Scripture Shusham, and by the Greeks and Latins Susiana, from the name of the capital city Susa). This code, discovered at the site of ancient Susa in 1901, afterward translated by the Dominican friar Schiel, who was the Assyriologist of Monsieur de Morgan's exploring expedition, and published in 1903 by order of the French Minister of Public Instruction, is inscribed on a great monolith of granite; it dates from 2200 B.C. It consisted originally of about 3,000 lines of writing in 49 columns, five of which are effaced; but the rest of the inscription of a very beautiful type is still plainly legible. The code begins with a law relating to witchcraft or sorcery, and touches all grades of social and domestic life, even determining the wages of workmen and laborers from the lowest to the highest. Very curious is the law regarding enchantments or sorcery. The person on whom the spell of enchantment has been laid must plunge into the Euphrates: if he sinks and drowns, his house goes to the sorcerer; but if he floats the sorcerer forfeits his life and his house. Proof of the general use of writing in Khammurabi's dominions is seen in the requirement of written testimony in lawsuits and in business transactions. The code commands that land be kept in cultivation; uncultivated and unimproved land is taxed at the same rate as neighboring cultivated land. The farmer whose crop is seriously damaged by storm is excused from paying interest on money loaned him. He through whose neglect the irrigation canals and ditches cause damages must make good the loss. The wineshop keeper — usually, it would appear, a woman — is required to «seize and drive to the palace» riotous persons who resort to her place: failing to do this she incurs the penalty of death. The defamer of an honest woman, be she wife or «votary,» is to be branded on the forehead. A man was permitted to divorce his childless wife. If a man divorces his wife without cause he must allow her alimony and custody of her children, also a share in his estate equal to a son's portion. Here are some points at which Khammurabi's code touches matters which were afterward made the subject of Hebrew legislation. Says the Elamite king: «If a man strike another in a quarrel and cause him a wound and he shall swear 'I did not strike him knowingly' he shall answer for the doctor.» The Hebrew law (Deut. xxi, 19) prescribes as penalty for one who smites another with stone or fist so that the injured man keepeth his bed, that the smiter shall «pay for the loss of his time and shall cause him to be thoroughly healed.» The Hebrew law punished with death «him that smiteth his father or his mother»; the punishment decreed by Khammurabi for the same offense was loss of the hands.

The word «cuneiform» is traced first to Thomas Hyde in 1700, professor of Hebrew at Oxford, and has passed into most modern languages. It is called *Keilschrift* or wedge-script, by the Germans, and *Mismari* or nail-writing by the Arabs.

CUNENE, koo-nä'nĕ, a river of South Africa, rising in about lat. 13° S. and entering the Atlantic in lat. 17° 20′ S. It flows at first in a southerly direction and afterward in a westerly direction. In its lower course it forms the boundary between the Portuguese and German territories in that region. At the mouth are sandbanks, and father up several cataracts.

CUNLIFFE, John William, American educator: b. Bolton, Lancashire, England, 20 Jan. 1865. He was educated at the University of London and at Owens College, Manchester. He taught English literature at McGill University, Montreal, from 1899 to 1906, at Columbia University in 1906, and at the University of Wisconsin until 1912. He then became professor of English and associate director of the school of journalism, Columbia University. He wrote 'The Influence of Seneca on Elizabethan Drama' (1907); edited Gascoigne's 'Supposes and Jocasta' (1906), and a complete edition of Gascoigne (1907–10; in 'Cambridge English Classics'), and 'Eastward Hoe' in volume II of Gayley's 'Representative English Comedies' (1913); and contributed to volumes III and V of the 'Cambridge History of English Literature' on 'A Mirror for Magistrates,' Gascoigne, and early tragedy. Other works are 'Writing of Today' (1915) and 'Poems of the Great War' (1917). He is joint editor of a revised edition of the Warner Library (1917–18), and contributes to philological journals.

CUNLIFFE-OWEN, (Philip) Frederick, American editor, son of the late Sir Philip Cunliffe-Owen, K.C.B.: b. London, England, 30 Jan. 1855. Since 1889 he has been one of the editors of the New York *Tribune;* is vice-president of the Pilgrims' Society of America, and director of Saint George's Society, New York. He is grand officer (with star) of the Order of Charles III of Spain; Osmanieh, Turkey; and commander of the Order of the Crown of Italy; commander of the Legion of Honor of France, and of Orange-Nassau, Kingdom of the Netherlands. He is a contributor to the *Nineteenth Century, Fortnightly Review,* the *North American Review,* and is author of a series of letters, signed Ex-Attaché, Fontenoy, Veteran Diplomat.

CUNNER, or **CHOGSET** (*Tantogolabrus adspersus*), one of the commonest of shore fishes on rocky ledges along the New England coast, and found from Virginia to Newfoundland. It rarely attains a length of one foot, and is of a brownish-blue color with yellowish reflections; the teeth are strong and sharp. Although an excellent panfish and a great favorite with the boy angler, its great numbers and its boldness render it a great pest to the professional fisherman, whose bait it continually strips from the hooks.

CUNNINGHAM, Allan, Scottish poet and miscellaneous writer: b. Keir, Dumfriesshire, 7 Dec. 1784; d. London, 30 Oct. 1842. When a youth he served as an apprentice to a stonemason. His spare time was given to song and the collection of traditions. In 1810 he contributed to R. H. Cromek's 'Remains of Nithsdale and Galloway Song.' The ballads in these collections, though purporting to be ancient popular songs, were Cunningham's own compositions. Later he became a reporter in London, and wrote 'Sir Marmaduke Maxwell,' a dramatic poem, and 'Lord Roldan' and 'Paul Jones,' interesting but rather theatrical romances. He became one of the best-known writers for the *London Magazine.* He subsequently obtained a situation in Chantrey's studio as foreman, or confidential manager, and this office he held till the sculptor's death. Other works are 'Traditional Tales of the Peasantry' (1822); 'The Songs of Scotland, Ancient and Modern' (1825); 'Lives of the Most Eminent Painters, Sculptors and Architects' (1829–33). He will be longest remembered for his song, 'A Wet Sheet and a Flowing Sea.' Consult Hogg, 'Life' with selections from works (London 1875).

CUNNINGHAM, John Francis, Roman Catholic bishop: b. Irremore, County Kerry, Ireland, July 1842. He was graduated at Saint Benedict's College, Atchison, Kan., 1860; studied theology in Milwaukee, Wis., and was ordained priest at Leavenworth, Kan., 1865. He was pastor at Fort Scott, Kan., 1865–68; Lawrence 1868–76; Topeka 1876–82; rector of Leavenworth Cathedral 1882–98, and was consecrated bishop of Concordia, Kan., 21 Sept. 1898.

CUNNINGHAME-GRAHAM, Robert Bontine, Scottish writer: b. 1852. He was educated at Harrow and sat in the House of Commons for North Lanarkshire as a Socialist, 1886–92. He has published 'Father Archangel of Scotland and other Essays' (1896); 'Journey in Morocco' (1898); 'Thirteen Stories' (1900); 'A Vanished Arcadia' (1901); 'Hernando de Soto' (1903); 'His People' (1906); 'A Hatchment' (1913); 'Life of Bomal Diaz del Castillo' (1915); 'Brought Forward' (1917).

CUNNINGHAMIA, a genus of the *Coniferæ* so named in honor of the botanists and travelers I. and A. Cunningham. The species *C. sinensis* is a tall and handsome tree, native of China and Cochin-China, with leathery leaves somewhat resembling those of the *Araucaria* (q.v.). It is too tender for the ordinary temperate climate, but is used in favorable localities as an ornamental tree, though never seen in its full beauty except in its native country, as the transplanted specimens must be small enough to be protected from the slightest frost. It is therefore known generally as a house-plant.

CUORE, kū-ō'rē, «a book for boys,» by Edmondo de Amicis, which, as he says in the brief preface to the story, is dedicated to the boys between 9 and 13 years of age in the elementary schools, and might well be entitled: «Story of a school year written by a third grade pupil in an Italian elementary school,» —meaning that the child noted the incidents and his father wrote the book, conforming, however, both in matter and manner, to the spirit of his little boy's version. The story which first appeared in 1886 had an extraordinary success, 785 editions (of a thousand each) having appeared up to 1917, a literary event hitherto unparalleled in Italy. Moreover, outside of Italy the success of the book was likewise very notable, no less than 22 translations of it appearing in the various world languages. As the name *Cuore* (Heart) indicates, the mainspring of what is told of the daily events of school life or in the stories supplementing them has its origin in the noblest and finest of sentiments that spring spontaneously from the heart, revealing that personality toward which sympathy is immediately attracted and which throughout life possesses a charm second to no other. The difference between Mantegazza's book for boys, 'Testa' (Head) and 'Cuore' of de Amicis, both of which aim to edify, is that in the former, which reminds the English reader of the «Rolla» books, the reader is conscious of the author's object, while in the latter he is not. Therein lies much of its success. In 'Cuore' the author extols love for one another, fraternity, equality and solidarity, all sterling democratic virtues, yet that in itself and for itself is not the purpose of the book, as A. Maurizio and Italian Socialists of his class attempt unsuccessfully to prove, implying that 'Cuore' is a work defending the privileges of the humble bourgeois class. 'Cuore' is the work of a sincere patriot upholding the traditional humanitarian virtues.

James Geddes, Jr.

CUP, Divination by, a mode of foretelling events, in use among the ancient Egyptians, and still surviving in some of the rural districts of England and Scotland. In the East, one method was to put small pieces of gold, silver and precious stones engraved with mystic characters into a cup of water, then to invoke the infernal powers, who replied by some signs in the cup. By the modern method, a person's fortune is foretold by the disposition of the sediment in his teacup after pouring out the last of the liquid.

CUP-AND-SAUCER LIMPET, shells of the gasteropod genera *Calyptræa* and *Crucibulum,* so called from having in the middle of the inside of the shell a cup-like process, the shell proper constituting the «saucer.» *Hipponyx* is another form. *Crucibulum striatum* occurs off shore on our coast.

CUP-SPONGE. The cup-sponge of Turkey (*Spongia adriatica*), also called the Levant toilet-sponge, is one of the finest sponges brought from the Mediterranean Sea. It is of the branch *Desmospongiæ.* See Sponge.

CUPID, in Roman mythology, the god of love, similar to the Greek Eros, the son of Mercury and Venus. He is usually represented as a winged infant, naked, armed with a bow, and a quiver full of arrows. Sometimes he was represented with a helmet, a spear and a buckler, intimating that even Mars himself owns the superiority of love. His power was generally shown by his riding on the back of a lion, or on a dolphin, or breaking to pieces the thunderbolts of Jupiter. He was supposedly capable of all sorts of mischief and is so represented in modern works of art. The 'Cupid Frescoes' at Pompeii are among the best examples of this portraiture. Consult Mau-Kelsey, 'Pompeii: Its Life and Art' (pp. 331–338, New York 1902). See Eros.

CUPOLA, in architecture, a hemispherical semi-elliptical roof, built of stone, timber, metal or glass. The ancient cupolas were hemispherical and were used with great effect by the Romans. The greater part of modern cupolas are semi-elliptical, cut through their shortest diameter. Of ancient cupolas, the finest is that of the Rotunda or Pantheon at Rome, erected under Augustus, and still perfect; of modern construction, some of the handsomest are those of Saint Peter's at Rome, of Saint Paul's, London, the Hotel des Invalides, Paris, Santa Maria da Fiori at Florence, Saint Sophia at Constantinople and the national capitol at Washington, D. C. The term is also applied to any small structure rising above the roof, not necessarily spherical, but of any shape. It is distinguished from «dome» in that it may be used either of the interior or exterior structure, generally the former. When the outer roof differs in shape from the inner roof it is proper to call the latter a cupola.

CUPPLES, Samuel, American manufacturer: b. Harrisburg, Pa., 13 Sept. 1831. At the age of 12 he was employed in a grocery store in Pittsburgh, but removed to Cincinnati in 1846, where he entered a woodenware establishment. In 1851 he was sent to Saint Louis to establish a branch house there, which as the house of Samuel Cupples & Company became widely known. In 1883 this was reorganized as the Samuel Cupples Woodware Company, of which its original founder is still president. It is the largest business of its kind in the world, its trade equaling in amount that of all other woodenware houses in the United States. He has taken a warm interest in education and has done very much to sustain the school system of Missouri. He was the original promoter of the Saint Louis Manual Training School and his gifts to educational institutions have amounted to several millions. Cupples Station (q.v.) is one of his most beneficent enterprises for the good of Saint Louis.

CUPPLES STATION, a railway junction in Saint Louis established by Samuel Cupples (q.v.) and others. An extensive system of railroad warehouses has the basements traversed by railroad tracks. Merchants are thus enabled to receive and reship goods with the expense of handling them reduced to a minimum, the expense and delay of cartage being eliminated from the problem. This vast property was presented by Samuel Cupples and his partner, R. S. Brookings, to Washington University, this institution collecting all rentals therefrom.

CUPRITE, kū'-prīt, native cuprous oxide, Cu_2O. It is the richest of the copper ores and occurs earthy, massive and granular, and also in beautiful isometric crystals which in the variety chalcotrichite are elongated into capillary crystals. Usually it is translucent, of adamantine lustre and very dark cochineal-red color. Its hardness is 3.5 to 4 and specific gravity about 6. Among its many important localities are Chessy in France, Cornwall in England, South Australia and Chile and in the United States at Bisbee and Morenci in Arizona.

CUR, a dog of any kind not highly valued, and in this way often particularly appropriated to dogs of mongrel breed. Naturalists use the term cur as the common designation of many races, of which the terrier may be considered as the type.

CURA, koo'rä, also **CIUDAD DE CURA,** Venezuela, city situated 56 miles west of Caracas and a short distance from Lake Valencia, in the old state of Miranda (now separated into the states of Rivas, Guárico and Miranda). It was founded in 1730 by Juan Bolivar y Villegas. The site of Cura is 1,600 feet above sea-level at the foot of a steep hill; an extensive valley, watered by two streams, outspreads before it. A record of its temperature shows as the maximum 87° F.; minimum 72°; mean annual 79° F. Owing to its proximity to the llanos of the Guárico and the surrounding agricultural and grazing districts, with their plantations of sugarcane, coffee, cacao, cotton, indigo, etc., as well as herds of cattle, Cura is a thriving little place. It suffered considerably in the War of Independence. In 1900 it was visited by a destructive earthquake. Pop. about 12,000.

CURAÇAO, koo-rä-sä'ō or kū'rą-sō, Dutch West Indies, an island in the Caribbean Sea, 46 miles north of the coast of Venezuela, between lat. 12° 3' and 12° 24' N., and long. 68° 47' and 60° 16' W., stretching northwest to southeast, 36 miles long and 8 miles broad;

capital Wilhelmstad. Its surface is generally flat, except for the hills in the southwest, whose highest elevation is 1,200 feet. Streams are few and the rainfall light. The chief minerals are iron and copper (but the mines are not developed), and salt. The cocoa-palm, banana and three varieties of the orange — from one of which varieties the far-famed Curaçao liqueur is made — grow abundantly. Sugar, tobacco and corn are raised. Curaçao was settled by the Spaniards early in the 16th century; it was taken in 1632 by the Dutch; and was captured by the British in 1798, but restored at the Peace of Amiens. It was taken again by the British in 1806, and finally ceded to Holland at the general peace in 1814. The island of Curaçao, together with the adjacent Dutch islands of Bonaire, Aruba, a part of Saint Martin, Saint Eustatius and Saba form a separate colony (area, 436 square miles) officially called Curaçao, administered by a governor, assisted by a council of four members and a colonial council of eight members. The members are nominated by the sovereign. Pop. colony, 54,469; of the island of Curaçao 32,585.

CURAÇAO, or **CURAÇOA.** The genuine Dutch liqueur of this name, so much esteemed for its taste and aroma, is prepared from a peculiar kind of bitter oranges growing in Curaçao, which fall from the tree before they are ripe, and which have an extremely persistent aromatic odor and taste. The rind of the orange is macerated, the white pulpy matter scraped off, and the yellow part, along with yellow fresh oranges, steeped in strong alcohol for 24 hours. The liquor is distilled and rectified, about half being collected, and this is mixed with a syrup made of fine white sugar. To this is added a certain quantity of curaçao infusion, which is a stronger alcoholic extract of the peel containing sugar, and then a certain proportion of water. The fluid is clarified and allowed to settle. The finest quality has a deep yellow color, which is sometimes improved by a few drops of tartaric acid.

CURARI, koo-rä'rĭ, **CURARE, OURARI,** etc., an arrow poison widely used by the natives of South America. Its exact composition is unknown, but it is certain that the juice of some species of *Strychnos* is always present. No species of *Strychnos* that is now known, however, has the same physiological action that curari has. Its method of preparation is kept secret and it is probably true that each tribe has its own method of preparing the poison. The physiological action of curari is unique. It is a type of pure motor paralysant, affecting the motor end organs in voluntary muscles. In death by poisoning from curari, the muscles of respiration becoming paralyzed, asphyxia results. Therapeutically, curari is of secondary service. Its varying composition and uncertain strength make it dangerous, and theoretically it would be indicated only in motor disorders of the voluntary muscles such as convulsive tics, torticollis, hydrophobia, etc. In the treatment of poisoning, artificial respiration is the best procedure.

CURASSOW, kū-răs'ō, a bird of the subfamily *Cracinæ* and family *Cracidæ* of the *Galliformes,* related to the guan (q.v.) and mound-bird (q.v.). The name is derived from the supposed origin of those first known to Europeans from the island of Curaçao. The curassows are exclusively birds of tropical America and are especially abundant in the forests east of the Andes. They are large, sometimes equaling the turkey in size, with handsome plumage and in some varieties crested head. Usually the trachea of the males forms a loop within the sternum, as in certain cranes, and this renders possible the clear ringing voices of these birds. They are chiefly arboreal, but also scratch on the ground for their food, which consists largely of nuts, berries and tender leaves. Most species also nest in trees and, as the young are precocious, a curious sight is presented by their scrambling among the branches while still in the down. Being highly prized for food, some of the species have been domesticated. The genus *Crax* has a soft cere and crested head; there are about 10 species in Central and South America. The *Nothocrax* has no cere, and the lores, or spaces between the eyes and beak, are naked. *Mitua* is similar, but the lores are feathered; *M. mitu* is a beautiful blue-black species of Brazil and adjoining countries to the north. *Pauxis* contains the well-known *P. galeata* of zoological gardens, in which the frontal region of the head bears a large, deep blue knob. It is a native of the extreme northern parts of South America. Interesting accounts of these birds will be found in Bates, 'Naturalist on the River Amazon' (1863).

CURB, a disease in horses consisting of strain of the straight ligament which runs down the back of the hock. It is most common in animals with straight small hocks and sickle hams. Like other strains it occurs from sudden and violent exertion, often proceeding in the lighter breeds from leaping or galloping in heavy ground, and in the heavier, from the effort of keeping back a load while going down a steep incline. Swelling appears on the outer and back part of the joint, about five or six inches below the point of the hock, generally causing lameness, most apparent in trotting, and, in slight cases, usually decreases after the animal has been out for 10 minutes. Fomentations must first be used to allay the irritation and inflammation, and a high-heeled shoe put in. When heat and tenderness disappear, cold applications will be advisable; after which, the enlargement still continuing, a blister may be necessary. From the first all work must be forbidden.

CURBINA. See DRUMFISH.

CURCULIO, kėr-kū'lĭ-ō, an insect-enemy of the plum. See paragraph *Insects,* under PLUM.

CURCULIONIDÆ, kėr-kū-lĭ-ŏn'ĭ-dē, the snout-beetles, or weevils (q.v.). One of the most extensive families of coleopterous insects. They belong to the section *Phynchophora* and all the species have a curious snout-like head.

CURCUMA, kėr'kū-mą, a genus of the *Marantaceæ,* the gingerwort and cardamom order. The corm is about as thick as the thumb, and is divided into several parts. The leaves which are about a foot long are lanceolate in form and sheathing. *Curcuma longa* is a turmeric plant, the tuberous rhizomes of which furnish the substance called turmeric (q.v.). This plant is extensively cultivated in southern Asia. *C. amada*, a native of Bengal, is the mango-ginger, which has qualities resembling ginger. From the colorless rhizomes of *C. leucorhiza* is prepared a kind of arrowroot. *C. zedoaria* yields a tonic medicine, and is also used as a food.

CURD. See CHEESE.

CURES, kū'rēz, an ancient town of the Sabines, 25 miles northeast of Rome, near the Tiber, the birthplace of Titus Tatius and of Numa, whence the Romans, after the people of Cures united with them, came to be called Quirites. The Lombards destroyed the town toward the close of the 6th century. It stood not far from the modern Corresi.

CURFEW, kėr'fū, also **CURFEU,** from the French *couvrir*, to cover, and *feu*, fire. The ringing of a bell at nightfall, originally designed as a signal to the inhabitants to cover their fires, extinguish lights and retire to rest. The practice is said to have been instituted by William the Conqueror, in all probability as a safeguard against fire, but the English in early days regarded the curfew as a badge of servitude. Originally the hour set for the ringing of the curfew bell was 8 o'clock, but it was also rung at 9 o'clock. The bell in each village or community which tolled the curfew became known as the curfew-bell. In certain parts of rural England the custom is still kept of ringing a bell at 9 o'clock.

The curfew bell was introduced into the United States early in the century, but without regularity of practice. About 1880 Col. Alexander Hogeland, who has been called «the father of the curfew-law,» introduced an ordinance in Omaha, Neb., compelling youths to absent themselves from steamboat landings, railroad stations and low variety shows. The curfew ordinance, somewhat changed and modified, was adopted in 1894 at Lincoln, Neb. The term curfew-law has since been given to all laws intended to keep young people off the streets after a certain hour, generally 9 o'clock at night. In 1894 at the National Convention of the Boys' and Girls' Home Employment Association in Indianapolis, the adoption of curfew ordinances was urged in view of the great increase in crime among children. Since that time the law has been generally enforced in over 3,000 cities and towns in this country. The officials of many of these towns report a decrease of 80 per cent in the arrest of boys and young men, under the provisions of the law, and former objections to the curfew have ceased. In 1898, a concensus of opinion was taken in 300 towns where the curfew law was in operation and all reports showed that there was a decided improvement in the youth morally and socially.

The curfew law, in general use, provides that all children under 15 years of age shall not be on the streets at night after 9 P.M. in summer and 8 P.M. in winter, without the written consent of their parents or guardians. The law has been endorsed by city officials, commercial associations, school boards and boards of trade in various sections of the country. The enforcement of the law has largely reduced the number of commitments to reform schools as is illustrated at the State Reform School at Boonville, Mo. During two years prior to the adoption of the curfew ordinance at Kansas City, Mo., 47 boys were sent to the reform school while for two years after the adoption of the law only 17 boys were committed from Kansas City. The ordinance has been recognized as a crime-reducer, child protector and home builder. Benjamin Harrison called the curfew-law, «the most important municipal regulation for the protection of the children of American homes, from the vices of the street, of the present century.»

CURI-CANCHA, koo-rē-kän'chä, the splendid Temple of the Sun, built by the Incas in Cuzco (q.v.), Peru, on the site now occupied by the church of San Domingo.

CURIA, a certain political division of the Roman people, said to have been established by Romulus; also the place of assembly for each of these divisions. According to Livy, Romulus divided Rome into 30 curiæ, and assigned to each a separate place of meeting. In early times only the members of the curiæ were in possession of the full citizenship of Rome. The curiæ were probably territorial divisions, including groups of related families. They had political functions and religious functions of various sorts. Consult Botsford, 'The Roman Assemblies' (New York 1909).

CURIA REGIS (Lat. «King's Court»), in English history, the name applied at different times to three distinct judicial bodies: (1) the feudal assembly of the tenants-in-chief; (2) the Privy Council, organized under Henry I; (3) the Court of King's Bench, founded in 1178. The first of these bodies constituted the Magnum Concilium or «Great Council of the Realm,» and combined the characters of the Saxon *witan* and the Norman feudal court. Its consent was necessary for the imposition of extraordinary taxes and the enactment of new laws; also, the king was supposed to consult its advice on general questions of state policy. In those days no distinction was recognized between the various functions of government — legislative, executive, judicial, financial, ecclesiastic or military; hence all royal measures of national importance were undertaken in the presence and with the consent of the Council. In course of time an inner council arose, the nucleus of which was provided in the royal household, and gradually took shape under Henry I as the *Curia Regis proper*. This was the beginning of the House of Lords, and was practically a committee of the parent body, which had grown too unwieldy. While legislative powers remained with the council, the committee supervised legislation generally, and was composed of high court officials appointed by the Crown. It comprised what may be regarded as the Privy Council, a bureau of administration, and a high court of justice, and in the course of centuries gave birth to all the administrative institutions of the United Kingdom as each was severed from the parent body and became an independent unit. In the reign of Henry I the *Curia*, presided over by the *Great Justiciar*, began to confine its operations mainly to judicial work, and its members were called justices, who sat in the Court of Exchequer. Every baron (lord) of this court was also a justice of the *Curia*, and from this connection arose the system of judicial circuits. Judicial administration was extended and developed by the *Curia* until it became part of the regular judicial machinery under Henry II. Up to that time the *Curia* moved with the king from place to place and held its sittings wherever the royal court happened to be located. In 1178, however, a separate committee of five judges was created to be fixed in one spot and determine criminal cases, and is to-day known as the Court of King's Bench. The separation of the Court of Common Pleas from the *Curia* was effected by Magna Charta (1215). The three bodies were completely separated with a distinct staff of justices for each, under Henry III. Another offshoot from the *Curia Regis* is the Court of Equity; while the Court of Exchequer, formerly the financial committee of the *Curia* under the Chancellor, is now part of the Supreme Court of Judicature. On the accession of the Tudors the Privy Council of the *Curia* was organized into the *Star Chamber* (1486), a distinctly illegal court in which the king's ministers sat as judges and conducted trials without juries, inflicting torture, mutilation, imprisonment and fines contrary to law. This unsavory institution, which was abolished in 1641, was the direct ancestor, strange to say, of the modern "Cabinet."

CURIA ROMANA, strictly, the authorities which administer the Papal Primacy, the ensemble of departments which assist the Sovereign Pontiff in the government of the Roman Catholic Church. It includes the tribunals, the offices of Curia and the Roman congregations. (See CONGREGATIONS, ROMAN). The tribunals of the Curia are three in number: the Sacred Penitentiaria, the Rota and the Apostolic Segnatura.

The Sacred Penitentiaria consists of the cardinal chief penitentiary; a regent, a theologian, datary, canonist, corrector, sealer, copyist, secretary, surrogate and archivist. It is formed of the cardinal penitentiary, the theologian, the datary, the corrector, the sealer and the canonist, the secretary also taking part in it, but without a vote. The other members are only consulted, the decision being left to the cardinal penitentiary. The constitution "Sapienti consilio" of Pius X confined the competency of the penitentiary to internal jurisdiction, it being granted powers to grant graces of all kinds in all internal matters — absolutions, dispensations, commutations, ratifications in matter of impediments, condonations and matters of conscience submitted to the judgment of the Holy See.

The Rota has competence in all contentious cases that must come before the Holy See and require a judicial investigation with proof, except the so-called major cases. It therefore tries in the first instance the cases, including criminal cases, which the Pope, either *motu proprio* or at the request of the contesting parties, calls up for his own judgment and commits to the Rota. It decides these cases even in the second or third instance. It is also the court of appeal for cases already tried judicially in episcopal tribunals of first instance. It also decides in the last instance cases tried by any inferior tribunal of second or further instance. The Rota is composed of the auditors, ranking as prelates, appointed by the Pope; they must hold a doctorate in theology or canon law and are automatically retired on attaining the age of 70. They form a college of which the oldest is dean. Each auditor chooses an assistant. Other officers are a promotor of justice, defender of the bond in matrimonial cases, and in cases relating to religious ordination, three notaries, selected by the college of auditors. The auditors decide by a majority vote and the sentence not only gives the conclusion arrived at but the reasons therefor.

The Apostolic Segnatura consists of six cardinals, appointed by the Pope, one of whom is its prefect. It has a secretary, a notary, consultors and a few minor officials. Under the new constitution promulgated by Pius X the Segnatura is a genuine tribunal, with jurisdiction in four kinds of cases, namely: accusations of suspicions against an auditor of the Rota; accusations of a violation of secrecy by an auditor of the Rota; appeals against a sentence of the Rota; and petitions for the nullification of a decision of the Rota that has already become *res judicata*. Special commissions are also given this tribunal from time to time by the Holy Father.

The officers of Curia are five in number: The Secretariate of State; the Apostolic Chancery; the Apostolic Dataria; the Apostolic Camera and the Secretariate of Briefs.

The Cardinal Secretary of State is the exclusive channel through which must pass all communications carried on between the Holy See and foreign powers. He is the Pope's prime minister — not of course in the sense which the word bears in countries where the Minister is more powerful than the sovereign, so that the former's "advice" overrides the latter's initiative — but in the proper sense of the term a faithful agent executing the intentions of his master, whom he serves to the best of his ability. He carries on the negotiations, in which the Pontiff is perpetually engaged, which have for their object to secure the liberties, extend the limits and promote the welfare of the Church. Under him are placed the nuncios and other diplomatic agents of the Holy See, and to him they make their reports. The officials under him consist of several *Minutanti*, writers in cipher, an archivist, subarchivist, etc. Being in close and permanent relations with the Pope he represents the principle of the Pontifical Government; his influence is consequently felt in all ways in acts emanating directly from the Pope; he directs all important political measures, puts in force the decisions relative to the other organic institutions of the Church, and transmits the instructions by which the functionaries of the Curia are guided.

The Apostolic Chancery takes its name from civil law and from the imperial chanceries, and in its essence is of very ancient origin. Since the Constitution of Pius X it has been reduced to a forwarding office (*Ufficio di Spedizione*) with a small personnel. It comprises the cardinal who presides, the regent, the college of apostolic prothonotaries, a notary, secretary and archivist, a protocolist and four amanuenses. At present the Chancery is charged only with the expedition of bulls for consistorial benefices, the establishment of new dioceses and new chapters and other important affairs of the Church.

The Dataria consists of a cardinal and datary, sub-datary, cashier, reviser, and writer of bulls, and minor officials. Formerly the Dataria was commissioned to grant many papal indults and graces, but since 1908 has only to investigate the fitness of candidates for consistorial benefices, which are reserved to the Holy See, to write and to dispatch the Apostolic letters for the collation of those benefices, to dispense from the conditions required in regard to them and to provide for the pensions or for the execution of the charges imposed by the Pope when conferring those benefices.

The Apostolic Camera administers the property of the Holy See during a vacancy of the latter. The cardinal-camerlengo presides over the Camera and is governed by the rules of the Constitution 'Vacante sede apostolica' of 25 Dec. 1906.

The Secretariate of Briefs consists of the secretary and two office assistants. The secretary is a prelate whose duty it is to write the Pontifical briefs addressed to emperors, kings, civil princes or other exalted personages. He also prepares the allocutions which the Pope pronounces at Consistories, and the Encyclicals or apostolic letters addressed to the bishops and to the faithful.

In addition to the above the Curia comprises certain commissions of cardinals, such as the commissions for biblical studies, for historical studies, for the administration of the funds of the Holy See or of the Peterspence, for the codification of the canon law, etc.; also the Pontifical Family. (See CONGREGATIONS, ROMAN; PAPACY; ROTA ROMANA). Consult Haskins, 'The Sources of the History of the Papal Penitentiary' (in *American Journal of Theology*, LIX, 1905); Chonet, 'La sacreé pénitencerie Apostolique' (Lyons 1904); Chiari, 'Memoria giuridico-storica sulla Dataria Cancellaria' (Rome 1900); Trombetta, 'De juribus et privilegiis prælatorum Romanæ Curiæ' (Sorrento 1906). A good popular account is that by Benedetto Ojetti in 'The Catholic Encyclopedia' (Vol. XIII, New York 1912).

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CURIATII. See HORATII.

CURICÓ, koo-rē-kō', Chile, a province lying between Colchagua and Talca. Area 2,915 square miles. It is divided into the departments of Curicó and Vichiquen. Its capital city, also called Curicó, has two commercial banks, several tanneries and other industrial establishments. It is 114 miles south of Santiago, with which it is connected by railroad. It has considerable trade with Argentina through the Planchón Pass. It was settled in 1743, though not on its present site. The port of Llico is on the Lake of Vichiquen. Numerous irrigating canals are derived from the Teno and Lontue, which unite to form the Mataquito River. Cereals, vegetables, wine, cattle, timber and fruits are among the products; there are also a few copper, silver and gold mines in the Cordillera and the coast range of hills, and the annual output of salt from the estuaries of the lakes of Vichiquen, Boyeruca and Bucalemu exceeds 25,000 tons. The State Central Railroad crosses the province. Pop. (province) 108,120; (city) 18,313.

CURIE, kū-rē', **Pierre and Marie,** distinguished physicists, the former French and the latter Polish, of whom a writer in the *Scientific American* has said that "they afford an example of a most interesting collaboration, since it concerns a husband and wife, both of high scientific attainments, who aided one another with their efforts and knowledge in the arduous path that finally led to the production of pure radium." M. Curie was born in 1859; d. Paris, 19 April 1906, and at the age of 20 years began to make independent scientific researches. In 1895 he received his appointment as professor of physics and chemistry, having discharged the duties of *chef de travaux* up to that time: and the future husband and wife met as teacher and pupil. Marie Sklodowska (born at Warsaw, November 1868) completed the usual course of study at the Warsaw gymnasium about 1884; afterward worked in the laboratory of physics of the Industrial Museum; in 1891 went to Paris and obtained a licentiate's degree in the mathematical sciences (1893), taking a degree in physical and chemical sciences two years later. Before M. Pierre Curie married her she had become instructor in physics at the high school of Sèvres. She entered the path marked out by her husband, and together they continued their experiments in the laboratory of the school of physics and chemistry. Toward the end of 1898 Professor and Mme. Curie positively confirmed what they had previously announced with respect to a new and strongly radioactive substance derived from pitchblende. In the first place they found an element to which they gave the name *polonium;* then their collaboration was rewarded by the discovery of radium (q.v.). In 1903 they were awarded the Nobel prize in physics jointly with A. H. Becquerel (q.v.). In 1904 M. Curie was made professor of physics at the Sorbonne and in 1905 a member of the Institute of France. His memoirs were published mostly in the 'Comptes rendus' of the French Academy. In 1908 Mme. Curie was appointed chief professor of physics in the University of Paris. In 1910 she was awarded the Albert medal of the Royal Society of Arts (England), and in 1911 she received the Nobel prize for chemistry. She wrote 'Recherches sur les propriétés magnétiques des aciers trempés' and 'Recherches sur les substances radioactives' (Eng. trans., 2d ed., New York 1904).

CURIO (clipped from *curiosity*), term still popularly used, though somewhat obsolete, to describe any kind of object of curiosity, especially such as would belong to cabinet collections, on account of antiquity, rarity or intrinsic interest, in such domains as pottery, porcelain, enamels, metal work, ivories, wood carving, arms, clocks, fans, watches, snuffboxes, musical instruments and the like.

CURITIBÁ, koo-rē-tē'-bā, Brazil, the capital of the state of Paraná, situated on a plateau 3,000 feet above sea-level. It is about 80 miles west of the port of Paranaguá. A railroad built in 1885 connects the city with the ocean. A line of steamships running directly between Paranaguá and Hamburg, Germany, is subsidized by the state. It manufactures coarse woolens and has considerable trade in maté and exports corn beef and tobacco. Pop. about 10,000.

CURLEW, kėr'lū, shore birds of the genus *Numenius,* belonging to the snipe family (*charadriidæ*). In this genus the bill is long, slender and accurate, and the toes are rather short, thick and margined. Most of the species are of large size for the family and about 15 are found throughout the world.

The long-billed curlew (*N. longirostris*) is the largest species, its total length sometimes exceeding two feet. It is found throughout temperate North America, but is rare in the New England States. In the interior it is common throughout the Mississippi Valley, where, as well as in the south Atlantic States, it breeds, laying three or four eggs on the ground in meadows or prairies. Like other species its principal food consists of worms, crustaceans and insects, but vegetable matter is also eaten. The Hudsonian curlew (*N. hudsonicus*) is smaller, with the bill scarcely more than one-half as long and the color of a less rufous tone than the last. It is more a bird of the North, breeding in the Arctic regions and migrating through the United States. The common curlew, Eskimo curlew, or dough-bird of gunners (*N. borealis*), is still smaller, having a total length of 12 to 15 inches and a bill of only 2 or 3 inches. This bird is remarkable for its extensive migratory movements in the spring and fall. Like the Hudsonian curlew it breeds in high northern latitudes, but winters still farther south in tropical America. During the migrations it abounds along the eastern seaboard of the United States. Consult Elliot, ‹North American Shore Birds› (1895).

CURLEWIS, Mrs. H. R. (ETHEL TURNER), Anglo-Australian novelist: b. Doncaster, England, 24 Jan. 1872. She was brought to Australia when nine years of age, was educated there and began to write in 1890. She was married in 1896 to H. R. Curlewis, a lawyer, and she and her husband live in Sydney. «Ethel Turner,» as she is known to the public, has a gift of telling stories for children and her works are very popular. But she does other work almost equally well. She is one of the most promising of the younger writers of the Australian school. Among her already numerous published works are ‹Seven Little Australians›; ‹The Family at Misrule›; ‹The Story of a Baby›; ‹The Little Duchess›; ‹The Little Larrakin›; ‹Miss Bobbie› (1897); ‹The Camp at Wandinong› (1898); ‹The Three Little Maids› (1900); ‹The Wonder Child› (1901); ‹Betty and Company› (1902); ‹Little Mother Meg› (1904); ‹White Root Tree› (1905); ‹In the Midst of the Mountain› (1906); ‹The Stolen Village› (1907); ‹That Girl› (1908); ‹Fugitives from Fortune› (1909); ‹Fair Ines› (1910); ‹The Apple of Happiness› (1911); ‹Pools and Happy Havens› (1912); ‹The Secret of the Sea› (1913); ‹The Flower o' the Pine› (1914); ‹The Club› (1915).

CURLING, a Scottish game played on the ice, with large smooth stones of a hemispherical form, with an iron or wooden handle at the top, which the players slide from one mark to another. The space within which the stones move is called the «rink» (32–42 yards long and 10 yards wide), and the hole or mark at each end the «tee.» The number of players upon a rink is 8 or 16 — 8 when the players use 2 stones each, weighing not more than 44 pounds nor less than 32 pounds without handles, and not of greater circumference than 36 inches, nor of greater or less height than one-eighth of the longest diamter, and 16 when they use 1 stone each. The object of the player is to lay his stone as near to the mark as possible, to guard that of his partner which has been well laid before, or to strike off that of his antagonist. When the stones on both sides have been all played, the stone nearest the tee counts one, and if the second, third, fourth belong to the same side, each counts one more. No stone is counted unless it reaches the mark called «hog score»; and if it passes out of the rink it is discounted also. One player on each side, called the «skip,» takes charge of the sweeping of the ice. The game is also played for individual points, no partners or sides being taken. The stones are usually polished to facilitate their speed. A set of matches is called «bonspiel.» The game is a very old one of Scottish origin and very popular in northern countries. International and interstate matches are played and trophies are awarded. There are various clubs devoted to the sport, the oldest being in Scotland. England, Ireland, Newfoundland, Russia, New Zealand, Switzerland and the United States have associate clubs. In 1867 the Grand National Curling Club was organized. Consult Ramsay, ‹An Account of the Game of Curling› (Edinburgh 1811); and Spalding's Annual Athletic Manual.

CURLY-GRASS, a common name for a fern (*Schizæa pusilla*), the typical genus of the climbing fern family. The plant is rare, being occasionally found in wet soil in the pine barrens of New Jersey and in Nova Scotia. The climbing fern family has 16 genera, of wide geographical distribution, the two American genera being *Schizæa*, as above, and *Lygodium*, represented by the Hartford fern.

CURRAN, Charles Courtney, American artist: b. Hartford, Ky., 13 Feb. 1861. He studied art in Cincinnati, the New York Art Students' League and the Académie Julien in Paris, France, receiving an honorable mention in the Salon of 1890. He has been awarded several of the prizes of the National Academy of Design and received medals at the World's Columbian Exposition and the Cotton States International Exposition and medals at the expositions of Paris (1900), Buffalo (1901) and Saint Louis (1904). He was elected to the National Academy of Design in 1904. There are pictures by him at Vassar College, in the National Gallery, Washington, D. C., the Pennsylvania Academy and the museums of Columbus, Richmond, Ind., Toledo and Buffalo. He has a wide range of subjects, but prefers to paint beautiful female nudes in idyllic surroundings. His color is delicate, his draftsmanship sure and minute. Among his noteworthy paintings are ‹Perfume of the Roses›; ‹The Breezy Day›; ‹Wild Asters on the Mountain Side›; ‹Victoria›; ‹June›; ‹In the Garden›; ‹The Lanterns.›

CURRAN, John Philpot, Irish orator: b. Newmarket, near Cork, 24 July 1750; d. London, 14 Oct. 1817. He was designed for the Church and educated at Trinity College, Dublin, after which he went to London and studied at one of the inns of court. His youth was rollicking and dissipated. He was called to the Irish bar in 1775, and in 1783 was chosen a member of the Irish House of Commons. Slow in gaining a practice, partly because of the known hostility of some of the judges to the young barrister, he attained lasting celebrity by his skilful conduct as defending counsel in a great series of state trials in the last decade of the 18th century, associated with political troubles. For this work he was singularly well adapted, his knowledge of the Irish peasantry lending a peculiar relish to his cross-examinations. His wit and virulence made him enemies if they gained him friends, and as a consequence he was a party to no fewer than five duels, none of them with serious results. A Protestant himself, he fought strenuously for the removal of Catholic disabilities and opposed, with all the eloquence at his command, the Act of Union. On the accession of Fox to power in 1806, he was appointed master of the rolls in Ireland, retiring on pension in 1814. The attachment of the Irish patriot Emmet for his daughter Sarah is commemorated in Moore's poem, "She is far from the land where her young Hero sleeps." Curran possessed talents of the highest order: his wit, his drollery, his eloquence, his pathos, were irresistible; and the splendid and daring style of his oratory formed a striking contrast with his personal appearance, which was mean and diminutive. Consult Davis, 'Life of Curran' (1846); Phillips, 'Curran and His Contemporaries' (1850).

CURRANT, originally, the small black, seedless raisins popularly used in cookery, and so named from the Greek city of Corinth, where they first became commercially important; by extension, various species of the genus *Ribes* and their fruits. The former belongs to the genus *Vitis* (see Grape Culture) of the natural order *Vitaceæ* or *Ampelideæ*; the latter of the *Saxifragaceæ*. Only the thornless species of the latter genus which bear grape-like clusters of smooth fruits are called currants; the spiny species are known as gooseberries.

The most widely cultivated species is unquestionably the red currant (*R. rubrum*) which has developed several white horticultural varieties as well as numerous red ones which are commercially important, both in the fresh state and when manufactured into jelly. The black currant (*R. nigrum*) is next in importance as a fruit but is less popular in America because of its peculiar flavor, less prolific habit and smaller range of usefulness. The first is a native of the north temperate zone, the second of Europe and Siberia. The American black currant (*R. floridum* or *americanum*) resembles the common black currant but, though sometimes found in gardens, is little esteemed. The flowering currant (*R. aureum*), an American species, has produced several horticultural varieties but is not cultivated for its fruit, which ripens very unevenly, but for its bright yellow sweet-scented flowers which appear in the spring. Several other species are grown for ornament, the most notable of which is the red-flowered currant (*R. sanguineum*) which is found on the Pacific Coast from British Columbia to South America. It has developed several varieties which are all attractive in flower but which bear rather dry, bitter berries erroneously reputed poisonous. Only the first three species are economically important, and that only in the North or in the higher altitudes of the South, where the hot summers injure the bushes. In the dry plains region they succeed only under specially favorable conditions such as irrigation and partial shade, etc. Several unrelated species of plants are called currant, but compared with the above are unimportant.

The currant thrives best in cool, rather humid climates, upon well-drained but moist strong clayey loams, and with less attention to cultivation, pruning, etc., than any other small fruit. However, it will respond liberally to good treatment and deserves better attention than it usually receives. The plants are generally propagated by means of hard wood cuttings which are transplanted to the field when one or two years old. The usual distances for planting are four by six feet, upon land well prepared by plowing and harrowing. The bushes are cultivated until mid-summer, when a cover crop is sown to be plowed under the following spring. Annually, two or three new stems should be allowed to grow, preferably from below ground, at the centre of the bush, and when this wood has borne fruit twice (that is, when three years old) should be cut out, since younger wood is more productive and less likely to become infested with insects and disease. On this account, training to the tree form is not recommended. A plantation should continue to be commercially profitable for 6 or 10 years after coming into bearing and should yield 100 bushels an acre if properly cared for. Yields of 250 bushels have been reported. Individual plants in gardens should produce from two to four pounds.

Of the many insects that attack the plant, the currant sawfly or currant worm (*Nematus ribesii*) is the best known. It is a European four-winged fly somewhat larger than a large housefly, which lays its eggs upon the midribs of the under sides of the leaves, particularly those near the ground, in early spring. The green, black-dotted worms frequently do considerable damage before their presence is suspected. Spraying with arsenites or hellebore as soon as the leaves appear and at intervals of about a week is a positive remedy. As a result of neglect, however, the bushes are frequently defoliated. A long-horned beetle (*Psenocorus supernotatus*) lays its eggs upon the shoots and branches into which the larvæ burrow and emerge as adults during late spring of the following year. When troublesome the bushes should be heavily pruned during the winter and the prunings burned. This treatment will also destroy other species of borer, the adult of which is a moth (*Sesia tipuliformis*). No practicable remedy has been discovered for the currant fly (*Epochra canadensis*) which sometimes is seriously troublesome, since its attacks the fruit, which ripens prematurely from the presence of larvæ beneath the skin.

All leaf diseases of the currant, the best known of which are anthracnose (*Glæosporium ribis*) and leaf spot (*Septoria ribis*), may be controlled by thorough spraying with a standard fungicide (q.v.). The former of these diseases is characterized by small black spots on the upper surfaces of the leaves and white ones beneath; the latter has black-centred white spots. The leaves fall prematurely in each case. The currant tubercle, a disease which attacks the whole plant, has become locally destructive in some of the Eastern States. The leaves wilt, the fruit colors prematurely, the clusters become small and few, and both foliage and fruit shrivel and fall. The plant soon dies. No remedy is known except prompt digging and

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burning. No diseased plants should be used for propagation because the disease seems to permeate the whole plant. Consult Card, 'Bush Fruits' (latest ed., New York 1911); Bailey, 'Cyclopedia of American Horticulture' (4 vols., ib. 1910).

CURRANT INSECT-PESTS. See CURRANT.

CURRENCY, a popular term sometimes used as synonymous with the phrase medium of exchange but more commonly confined to the paper elements of the medium. If used in the broader sense, two kinds should be distinguished, metallic and paper.

Metallic Currency may be classified on the basis of its form as bullion and coin. Bullion is a name applied to uncurrent coins and to gold and silver bars or ingots. The metal in these may be *pure*, that is, without alloy, or *standard*, that is, mixed with the amount of other metals prescribed by law for coins. For example, a law approved 18 Jan. 1837 prescribed "that the standard for both gold and silver coins of the United States shall hereafter be such that of 1,000 parts by weight 900 shall be of pure metal and 100 of alloy; and the alloy of the silver coins shall be of copper; and the alloy of the gold coins shall be of copper and silver, provided that the silver does not exceed one-half of the whole alloy." These gold and silver bars are chiefly used as material for the manufacture of coin or in the payment of balances between banks, especially those located in different countries. The latter is their chief use as currency. They may, however, and doubtless sometimes are, used in payments between individuals and between individuals and banks.

Coins are stamped pieces of metal in form, size, weight and design of the stamp, calculated to fit them for use as hand-to-hand money. The form found to be most serviceable is that of a flat, circular disc with a milled edge. The circular form and the milled edge make clipping difficult and loss of weight from wear and tear easily observable. The flat sides present a surface well adapted to receive a stamp. In order that the sizes and weights of the coins may be convenient, gold, silver, nickel or some kind of an amalgam and copper are used in their manufacture in all countries in which commerce is well developed, gold for those of highest denominations, silver for those denominations next lowest, nickel or amalgam for those next and copper for those of the lowest denominations.

The denominations found most convenient are those based upon the so-called decimal system. According to this the coin of lowest denomination is usually one-one-hundredth part of the unit coin and the other subdivisions are one-twentieth, one-tenth, one-fourth or one-fifth and one-half of the unit. The other denominations are the unit and multiples of 5, 10 and 20 times the unit. For example, in the United States the unit coin is the dollar and the subdivisions are 1, 5, 10, 25 and 50 cent pieces, and the multiples are 5, 10 and 20 dollar pieces. The 1 cent piece is made of copper, the 5 cent piece of nickel, the 10, 25 and 50 cent pieces and the dollar of silver, and the 5, 10 and 20 dollar pieces of gold.

The only noteworthy exception to the decimal system among the nations of the present day is England. She has preserved the original system which was in operation in European countries before the decimal system was adopted. The old system was derived from the system of weight at the time in use. As it is preserved in England the unit called the pound sterling is subdivided into 20 parts called shillings and these again into 12 parts called pence, and these again into four parts called farthings. The denominations of the coins are the farthing, half-penny, penny, sixpence, florin or two-shilling piece, half-crown or two and one-half shilling piece, the crown, half sovereign, sovereign, two and five-sovereign pieces. The farthing, half-penny and penny are made of copper, the sixpence, florin, half crown and crown of silver, and the half sovereign, sovereign, two and five-sovereign pieces of gold.

The stamps put upon coins are designed to indicate their denominations, to make counterfeiting difficult, and to serve artistic and commemorative purposes. The names given to them frequently have historical as well as practical significance. From the point of view of their relation to each other, coins may be classified as standard or subsidiary. *Standard coins* are those made of the standard of value, which in most countries at the present time is gold, and which are coined for individuals who bring to the mint metal of the proper standard. A small charge called seniorage may be made or the entire expense of the coinage may be borne by the government. *Subsidiary coins* are those which are made redeemable on demand in standard coins. They are usually also made legal tender only for relatively small payments; coined on government account and in limited quantities, and the amount of the standard metal for which they are redeemable exceeds in market value that of the amount of the metal of which they are made.

It is only by thus making some coins subsidiary to others which are standard that a currency consisting of coins made of different metals can be maintained. Otherwise, since the relative values of the different metals are constantly changing it will always be found profitable to melt down certain of the coins for sale as bullion or to ship them abroad, where they always pass at their bullion value. For example, suppose at the time a coinage system is established 300 grains of silver is exactly equivalent in value on the bullion market to 20 grains of gold, and that accordingly coins containing each 20 grains of gold and legal tender for one dollar, and others each containing 150 grains of silver and legal tender for half a dollar are freely coined at the mints for individuals bringing metal of the proper standard. Soon the relative value of gold and silver on the bullion market changes so that 20 grains of gold are equivalent in value to 400 grains of silver. Then it will be profitable to melt down the gold coins for sale as bullion or to use them in foreign payments at their bullion value and at home to use two silver half dollars in making a dollar payment instead of a gold dollar. This condition is prevented by making the silver coins subsidiary. They can then only be obtained by purchase from the government at the rate of two silver half dollars for a gold dollar. Since the government at any time will give back a gold dollar for two silver half dollars, there will be no reason for anyone's refusing to take two silver half dollars for a dollar's worth of goods. The government protects itself from the danger and expense of an excessive volume of redemptions of silver coins by itself monopolizing their manufacture and by limiting the amount strictly to the need for them as a circulating medium.

Certain coins, notably the silver dollar of the United States and the five-franc piece of the states of the Latin Monetary Union, occupy a somewhat anomalous position, being neither subsidiary in the strict sense of that term nor standard but midway between the two.

Paper Currency is distinguished by the element of credit which is its dominant characteristic. It may be defined as a record of an obligation to pay made in a form suitable for monetary purposes. It may be the obligation of a government, of a bank or of some other kind of a private corporation or even of a private person. The obligation is always expressed in terms of the standard value of the nation in which it is issued. The form may be that of a promise to pay or that of an order to pay. If the former, the notes recording the promise are usually issued in denominations suitable for use as hand-to-hand money and are made payable to bearer on demand.

Paper currency will circulate wherever the credit of the party which issues it is known or believed to be good, provided its form is suitable for commercial purposes, and it may circulate at a discount even when the credit of the issuing party is not of the best. Within the territory in which it circulates the extent of its use, which is now greater than that of any other form of currency, is due to its superior convenience and safety and to the economy of its use. For large payments it is more convenient and economical than coin and for payments between people located in different places and for the use of travelers and for nearly all payments by mail or express it is safer as well as more convenient and economical. The most widely used kinds of paper money are circulated through the agency of governments and banks.

Government Currency, as the former kind may be called, consists of notes issued by governments in denominations suitable for monetary purposes, payable to bearer on demand and usually, though not always, non-interest-bearing. They may be *convertible* or *inconvertible*, that is, redeemable in coin on demand or not so redeemable. In the latter case the obligation of the government to redeem them is unquestioned, since it is usually expressly stated in the form of a promise, but the time of redemption is left for future determination. The form of the two kinds of notes may be identical, in which case the only difference between them is that in the one case the government actually redeems its promise to pay on demand and in the other it does not.

In order to aid in the circulation of inconvertible government notes they are usually made legal tender,— that is, their tender in the payment of debts is declared by law to constitute a legal fulfilment of the obligation;— and they are made receivable for taxes and most, if not all, other public dues. The fact of their inconvertibility, however, renders them inferior to the metallic elements of the currency, all of which are freely interchangeable, and the standard coins of which have a market value as bullion, identical or identical less a small seniorage charge, with their value as coin. They, therefore, depreciate, that is, they are exchangeable on the money market for something less than the amount of coin which is indicated in the promise to pay which they record. The amount of depreciation depends upon subjective influences. It is a fairly accurate expression of the combined judgment of the people regarding the credit of the government and the time at which it is likely to redeem the promises it has expressed on the notes. It is, therefore, subject to wide, sudden and frequent fluctuations. On account of their depreciation inconvertible government notes take the place of coin in the circulating medium since the latter can more profitably be sold as bullion or exchanged for notes on the money market at their discounted value, and the former being legal tender may be used in all payments. Since everyone must receive and pay out these depreciated notes, they necessarily quote prices in terms of them, and consequently all prices rise to the extent of the depreciation of the notes and thereafter fluctuate in accordance with the amount of their depreciation. On account of the subjective and consequent erratic character of these fluctuations all business becomes highly speculative, calculations based on a study of cost, demand and supply and the other factors upon which sound business depends become untrustworthy and everybody is forced to gamble in order to live. The circulation of such notes, therefore, constitutes a national calamity.

Convertible Government Notes may be merely representatives of coin, as is the case of the silver and gold certificates of the United States, in which corresponding amounts of coin are kept in the vaults of the Treasury, or they may be only partially covered by coin, as in the case of the greenbacks of the United States, in which a reserve of from $100,0000,000 to $150,000,000 of gold coin is kept for the redemption of $346,000,000 and some thousands of dollars of notes.

Bank Currency may be in the form of notes or of what is called deposit currency. *Bank notes* are promises of banks to pay to bearer on demand issued in denominations suitable for use as hand-to-hand money. They are usually convertible but sometimes inconvertible, in which case in essentials they resemble inconvertible government notes. Since the circulation of bank notes depends primarily upon the credit of the bank which issues them, many devices have been employed to secure their safety. Among these the most noteworthy are the assets, special security and safety fund devices. According to the assets system noteholders are given a first lien upon all the assets of the bank and the quantity issued is usually limited to a percentage of the assets. According to the special security system the bank of issue is required to purchase certain specified securities, such as government bonds, real estate mortgages or commercial paper, and to mortgage them to the noteholders as security. According to the safety fund system a special fund of cash or securities or both, contributed pro rata by all the issuing banks in the system, is set aside, usually under government control and supervision, out of which the notes of any failed bank may be paid. Two or more of these systems may be combined.

Deposit Currency is operated in the following manner: The customers of a bank trade cash, checks and drafts on other banks and interest-bearing promissory notes or bills of exchange due in the future for credit balances on a so-called checking account. By the use of orders upon the bank called checks they may have a part or all of their balances transferred to the credit of other customers of the bank or to that of customers of another bank, or they may acquire so-called drafts on banks in other places which enable them to transfer their credit balances to those places for similar use. By similar arrangements between banks this machinery operates in such a way that exchanges between people in the same town, in different towns and even in different countries are affected by the process of debiting and crediting these checking accounts. The greater part of the exchanges of the commercial world are now-a-days effected in this way. Deposit currency and bank notes based on general assets or on commercial paper possess the especial merit of elasticity, that is, they automatically fluctuate in volume in accordance with the needs of commerce. This is due to the fact that they are created by the sale of notes or bills of exchange representing needs for currency and disappear by return to the banks of issue when said notes or bills of exchange mature. Consult Dodd, 'History of Money in the British Empire and in the United States' (London 1911); 'Reform of the Currency' (pub. by the Academy of Political Science, New York 1911); Hepburn, A. B., 'History of Coinage and Currency in the United States' (ib. 1903); Sumner, 'A History of American Currency' (ib. 1878).

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CURRENCY BILL of 1900 (15 February), the culmination of the many years' struggle between United States parties over the standard of value; ending in the complete victory of the gold party, 46 to 29 in the Senate on the adoption of the bill. The provisions are: The unit of value to be the gold dollar of 25.8 grains, 9-10 fine; all United States money to be maintained at a parity with it and all government paper-money to be redeemable in gold. A redemption fund of $150,000,000 to be set apart not to fall below $100,000,000, and if necessary replenished by sale of bonds at not over 3 per cent. As fast as silver dollars are coined, an equal amount of treasury notes to be replaced by silver certificates; gold certificates on certain conditions to be issued against the gold in the treasury. No United States or treasury notes to be of less than $10, nor silver certificates of more than $10. The bonded debt may be refunded in 30-year 2 per cent gold bonds, at not less than par. Any national bank may issue circulating notes up to its paid-up capital by depositing an equal amount of national bonds.

CURRENT, a flow or stream of a body of water, more or less rapid, by which vessels are compelled to alter or modify their course or velocity, or both, according to the set or drift of the current. Rivers have currents varying in strength, chiefly according to the inclination of the bed down which they flow.

The technical language in which the flow of water and its channels are known and described is as follows: The bed is the water-course, having a bottom and two sides or shores. When the latter are described as right- or left-hand, going down stream is assumed. The transverse section is a vertical plane at right angles to the course of the current. The perimeter is the length of this section in the bed. The longitudinal section or profile is a curve whose abscissa is proportional to the distance up or downstream from a given point and whose ordinate is proportional to the depth. The slope or declivity is the mean angle of inclination of the surface of the water to the horizon. The fall is the difference in the height at any two points of determinate distance apart, as, for instance, eight inches to the mile. The line of current is the direction of maximum velocity. The mid-channel is the deepest part of the bed. The velocity is greater at the surface than at the bed. The surface is higher in the current than at the shore when the river is rising, lower than at shore when the river is falling. The direction is the set of the current; the rate is the drift of the current. For electric current, see ELECTRICITY. See also OCEAN CURRENTS.

CURRENT EFFICIENCY. See FARADAY'S LAWS.

CURRENT METER, an instrument for measuring the velocity of the flow in rivers and streams. The current meter used by the United States Geological Survey consists of two essential parts: (1) a wheel which is so arranged that the flowing water shall turn it steadily, and (2) a device for recording the number of such revolutions. The earlier forms of meters were mounted on floats and measured only the surface velocity. This was soon proved inadequate, and was improved so that measurement at any depth may be made. The current meters in present use are of two distinct types, direct-action meters and differential-action meters, the classification depending on whether in revolving the wheel the water does or does not exert a force which tends to retard the wheel's motion. In the direct-action type the wheel carries vanes (either flat or warped) set on a horizontal axis and revolving by the direct pressure of the moving water against the vanes. In this form of meter the friction increases as the velocity decreases. In the differential meter the wheel is made up of a series of cups at the extremities of short spokes. This wheel revolves on a vertical axis. The pressure of the current of water on the concave side of the cup is greater than on the convex side in the proportion of 100 to 38. The wheel revolves slower than the direct-action wheel and the friction increases with the velocity, but is overcome by the increased motive power developed by the velocity. The current meter is usually equipped with a tail which holds it steady in the current. It may be attached rigidly to rods from an overhead bridge or hung by a cable. In the latter case weights are attached below to hold it in position. In high velocities or deep streams guy wires are attached. The recording mechanism is on the bridge or on shore, connection being made by an electric cable, and the record is made by electricity supplied by a battery. The true relation between the revolutions of the meter wheel and any velocity of a stream must be established individually for each meter before it is used.

This testing is called rating. A current meter is rated by drawing it through still water at a uniform speed and noting the number of revolutions as to time and distance, from which the number of revolutions per second is computed. Many such experimental runs are made with each meter at different speeds and the results are so recorded as to be quickly available in computing current velocities from any record that individual meter may make.

CURRENT RIVER, a river of Missouri, rising among the Ozark Mountains in the southern central part of the State, flowing southeast and south into the Black River in Arkansas; length about 250 miles.

CURRENTS, Ocean. See OCEAN CURRENTS.

CURRICULUM, the term applied to a course of study, or collectively to that of any type of educational institutions, as the college curriculum, the high-school curriculum, the common-school curriculum, etc. The historical basis of the modern educational curriculum is found in the Seven Liberal Arts of the Middle Ages, which developed from Greek philosophical speculation and educational practices. As long as the idea of the symbolical perfection of this organization of studies and of human knowledge prevailed there was no modification of the form of the curriculum, though the content of these terms was modified from time to time. All lower education was included in the subject of the *trivium*, i.e., grammar, rhetoric and dialectic, which represented so many approaches to the Latin language. This was based on the work of the "singing school," which furnished to the child the school arts (reading and writing), with a modicum of arithmetic. The curriculum of higher education included the subject of the *quadrivium*, i.e., arithmetic, geometry (mathematics and geography), astronomy (natural sciences) and music (æsthetic, etc.). The elaboration of the curriculum under the influences of the early universities and of the Renaissance consisted chiefly in the addition of the subjects of medicine and law, both common and civil, and in the change in the content of the subject of the quadrivium. These changes can be followed in the successive papal rules and university regulations which prescribed the books that should be read in the several subjects. From the time of the Renaissance to the close of the 18th century there was no modification in the organization of the educational curriculum and little in the content. From that time, however, the changes have been numerous and radical, and the old idea of the historical and logical perfection of the traditional curriculum has largely disappeared. In the United States, where conditions permitted these changes with less opposition than in the more conservative societies, very extensive changes have occurred, and an almost chaotic condition has ensued. These changes have consisted primarily in the addition of new subjects to each of the stages of the curriculum, due to the great development of knowledge, especially scientific, during the 19th century. The curriculum of the elementary school has expanded in content from the three fundamental school arts until it now embraces from 12 to 15 subjects in half that many spheres of intellectual interests, and in time, from three or four years to eight and nine; the secondary curriculum has undergone no expansion in time, perhaps a diminution, owing to the encroachment of both the lower and the higher curricula, but has added so great a number of subjects that it deals in a preliminary way with almost all those included within the curriculum of college and university. The problem of curriculum is twofold — that of content and that of organization. This twofold problem is now and long has been the chief topic of educational discussion in the United States. The matter has received extended study by American educators and has formed the subject of two important reports by committees appointed by the National Education Association. Consult 'Reports of the National Education Association' (Washington 1865 et seq.); 'Proceedings of the National Education Association'; Payne, 'Public Elementary School Curriculum' (Boston 1905); Henderson, 'Textbook in the Principles of Education' (New York 1910); Ruediger, 'Principles of Education' (Boston 1910); Cubberley, 'Changing Conceptions of Education' (Boston 1909).

CURRIE, SIR Arthur William, Canadian soldier: b. Napperton, Middlesex County, Ontario, 5 Dec. 1875. He was educated at Strathroy Collegiate Institute, and migrated to British Columbia in 1893, where for a time he taught school at Sydney and afterward engaged in real estate business in Victoria. Always keenly interested in military affairs, he served for 14 years with the 5th regiment of Canadian Garrison Artillery, and afterward became lieutenant-colonel of a Highland regiment, the 50th, of Victoria. He was elected president of the Rifle Club of British Columbia in 1907. On the outbreak of the Great War in August 1914 he immediately volunteered for active service, and went overseas as a brigadier. He has taken a distinguished part in many of the stiffest battles of the war — the second battle of Ypres, Saint Julien, Courcelette. Thiepval and Vimy Ridge. In September 1915 he was appointed to the command of the 2d Canadian Division; and it was said of his division that it never lost a trench. He has been repeatedly mentioned in dispatches; was created C.B. and awarded the Legion of Honor and the Croix de Commandeur in 1915. On 3 June 1917 he was created K.C.M.G. He was appointed to succeed Sir Julian Byng in command of all the Canadian forces at the front, and was shortly thereafter raised to the rank of lieutenant-general.

CURRIE, Lady Mary Montgomerie Lamb Singleton ("VIOLET FANE"), English poet and miscellaneous writer: b. Littlehampton, Sussex, 24 Feb. 1843; d. Harrogate, 13 Oct. 1905. She was married in 1864 to Henry Sydenham Singleton, who died in 1893, and in 1894 to the 1st Baron Currie. Her books, published under her pseudonym, are 'From Dawn to Noon' (1872); 'Denzil Place' (1875); 'The Queen of the Fairies' (1876); 'Edwin and Angelina Papers' (1878); 'Collected Verses' (1880); 'Sophy, or the Adventures of a Savage' (1881); 'Thro' Love and War' (1886); 'Autumn Songs' (1889); 'Helen Davenant' (1889); 'Under Cross and Crescent' (1896); 'Betwixt the Seas' (1900); 'Two Moods of a Man' (1901); 'Collected Essays' (1902).

CURRIER, Charles Warren, American Catholic prelate: b. Saint Thomas, Danish West

Indies (now Virgin Islands, U. S. A.), 22 March 1857. He was educated at Roermond and Wittem, Holland; was ordained to the priesthood in 1880; and served successively as missionary in South America and in the United States. He was also lecturer, pastor, professor of Latin, assistant, etc., at the Bureau of Catholic Indian Missions, Washington, D. C., 1905 to 1913. In 1913 he was consecrated bishop of Matanzas, Cuba, resigned in 1915 and was made titular bishop of Hetalonia. He represented the United States government at several international congresses of Americanists. He is a member of the American Oriental Society and the Spanish American Athenæum. He has published ‘Carmel in America’ (1890); ‘History of Religious Orders’ (1894); ‘Dimitrios and Irene’ (1893); ‘The Rose of Alhama’ (1895); ‘Cuba, What Shall We Do with It?’ (1898); ‘Lands of the Southern Cross’ (1911). He is a contributor to the ‘Catholic Encyclopedia,’ the *American Ecclesiastical Review,* etc.

CURRY, Jabez Lamar Monroe, American educator and diplomat: b. Lincoln County, Ga., 5 June 1825; d. Asheville, N. C., 12 Feb. 1903. He was graduated at the University of Georgia in 1843 and at Harvard Law School in 1845. He served in the Alabama legislature from 1847 to 1855 and in Congress from 1857 to 1861, and then became a member of the Confederate Congress. He became a Baptist minister; served in the Confederate army; was president of Howard College 1866–68; and in 1881 was appointed general agent of the Peabody Educational Fund and later also of the Slater Educational Funds. He was Minister to Spain 1885–89, and special ambassador from the United States at the coronation of King Alfonso XIII of Spain, 17 May 1902. He published ‘Constitutional Government in Spain’ (1889); ‘William Ewart Gladstone: a Study’ (1891); ‘The Southern States of the American Union’ (1894); ‘Difficulties, Complications, and Limitations Connected with the Education of the Negro’ (1895); ‘Civil History of the Government of the Confederate States, with some Personal Reminiscences.’

CURRY, Samuel Silas, American educator: b. Chatata, Tenn., 1847. He was graduated at Grant University 1872. He received the degrees of A.M. and Ph.D. at Boston University. He has gained wide reputation as a teacher of speaking and of the voice. He has been connected as a teacher with Boston University, Harvard University, Newton Theological Institution and Yale Divinity School, and has lectured and given short courses in many other universities. He is the founder and head of the School of Expression, Boston, Mass. His publications are ‘Mind and Voice’; ‘Foundations of Expression’ (1908); ‘Province of Expression’ (1891); ‘Classics for Vocal Expression’; ‘Vocal and Literary Interpretation of the Bible’ (1903); ‘Lessons in Vocal Expression’ (1895); ‘Imagination and Dramatic Instinct’ (1896); ‘Browning and the Dramatic Monologue’; ‘Little Classics for Oral English’ (1912); ‘Spoken English’ (1913); ‘The Smile’ (1915); ‘How to Add Ten Years to Your Life’ (1915); ‘Bell.’

CURRY NORMAL AND INDUSTRIAL INSTITUTE, institution for the training of colored youths, founded in 1889 at Urbana, Ohio, by E. W. B. Curry. The institute includes a Bible school and normal, literary, commercial, music and industrial departments. The extension work is conducted through a race conference and a social settlement. There is an average of 10 instructors and officers in the faculty. The real estate and equipment are valued at $50,000 and the annual income to about $7,000. In 1913 the institute received a gift of $2,000 from Martha Fouse, a former slave. The institute depends for its support upon gifts from the general public. The library contains about 5,000 volumes. Since the foundation of the institute over 2,000 students have been assisted in obtaining an education.

CURRY POWDER and CURRY PASTE, compound condiment added to cooked dishes of meat and rice to render them piquant and appetizing. So generally is curry powder employed in East Indian cookery that it has been called the «salt of the Orient.» The substances that commonly form the bases of these powders are turmeric, fenugreek and sago. To these ginger, black and Cayenne pepper, coriander, caraway and many other spices are added in varying quantities, or omitted, according to the locality. Such curry powders as contain the pulverized leaves of *Murraya kœnigia* are used not only as aromatic stomachic stimulants, but as remedies for dyspepsia, diarrhœa and even dysentery. The basis of many curry pastes is tamarind.

CURSE OF SCOTLAND, The, in cards, a term applied to the nine of diamonds. Its origin is unknown. Among the many explanations offered are the following: (1) The nine of diamonds is the «pope» in the game of Pope Joan, and hence the symbol of Antichrist to the Reformers. (2) It is the chief card in comette, which game ruined many families in Scotland. (3) It goes back to the nine lozenges on the Dalrymple arms, the Earl of Stair having been responsible for the massacre of Glencoe. (4) Tradition says that the Duke of Cumberland, while drunk and gambling on the night before the battle of Culloden, wrote across the face of this card the order that no quarter was to be given on the morrow.

CURSORES, kėr'sō'rēz, or **RUNNERS,** the *Ratitæ* (q.v.).

CURTESY, in law, the life interest which the surviving husband has in the inheritable estate of the wife. Originally curtesy attached, as dower still does in most of the United States, to all estates of inheritance of which the wife was seized at any time during the marriage. But it is now generally, though not invariably, limited to such lands as she is seized of at her death; and she may therefore, in most States, by alienating the land during her lifetime or by last will and testament, defeat her husband's claims as tenant by the curtesy. See Blackstone, ‘Commentaries on the Laws of England’; Pollock and Maitland, ‘History of English Law’ (Boston 1899); Tiffany, ‘Law of Real Property.’

CURTILAGE, the enclosed space of ground and buildings immediately surrounding or lying near a dwelling and used for its convenient occupation. The term is of feudal origin and originally meant a castle and outbuildings enclosed in a stone wall for defense. There is no exact limit to the area which may be included under the term, and it is a matter of proof in each case as to what is set apart for the use of any particular dwelling. The law has always given the curtilage greater protection than outside property, and this idea prevails to-day, as in most jurisdictions breaking and entering curtilage is burglary, and setting fire to any building in it constitutes arson. See ARSON; BURGLARY; REAL PROPERTY.

CURTIN, Andrew Gregg, American politician: b. Bellefonte, Pa., 22 April 1815; d. there, 7 Oct. 1894. He studied law at Dickinson College, and was admitted to the bar in 1839. Entering politics, he became secretary of the Commonwealth of Pennsylvania in 1854, governor in 1860 and again in 1863, being one of the most noted «war governors» of the Civil War period. In 1869 he was appointed Minister to Russia. In 1873 he left the Republican party, and from 1881 to 1887 sat in Congress as a Democrat. Consult Egle, W. H., ‘Life and Times of Andrew Gregg Curtin’ (Philadelphia 1896).

CURTIN, Jeremiah, American linguist and antiquarian: b. Milwaukee, Wis., 1838; d. Burlington, Vt., 14 Dec. 1906. He prepared for Harvard and was graduated there in 1863. At the university he became an excellent linguist. In 1864 he entered the diplomatic service, becoming secretary of legation for the United States at Saint Petersburg, where he remained until 1870. During his stay in Russia he made a study of Slavonic and allied languages. This knowledge he turned to account in his translations of Tolstoy, Zagoskin and Sienkiewicz, being the first to introduce the latter to the English-speaking world. From 1883 to 1891 he was connected with the Bureau of Ethnology of the Smithsonian Institution. Afterward he made independent researches concerning the North American Indians. He was reputed to have known 70 languages, 12 more than the redoubtable Cardinal Mezzofanti. By his translations from the Russian, Polish, Czech and other languages he added enormously to our knowledge of foreign literature. Besides his translations he wrote ‘Myths and Folklore of Ireland’ (1906); ‘Tales of the Fairies and the Ghost World’; ‘Myths and Folk-Tales of the Russians, Western Slavs, and Magyars’ (1894); ‘Hero Tales of Ireland’ (1894); ‘Creation Myths of Primitive America’ (1898); ‘The Mongols’ (1907); ‘The Mongols in Russia’ (1908); ‘A Journey in Southern Russia (1909); ‘Myths of the Medocs’ (1912).

CURTIS, Alfred A., American Catholic prelate: b. Somerset County, Md., 4 July 1831; d. 11 July 1908. When only 21 years old he was ordained in the Episcopal ministry and for several years labored in Baltimore and western Maryland, finally returning to Baltimore. Later he resigned his ministerial duties, entered the Catholic Church, took a theological course, was ordained priest by Archbishop Bayley, 17 Dec. 1874, and stationed at Baltimore Cathedral till 14 Nov. 1886, when he was consecrated bishop of Wilmington, Del. He resigned in 1896 and in 1898 became vicar-general of Baltimore.

CURTIS, Benjamin Robbins, American jurist: b. Watertown, Mass., 4 Nov. 1809; d. Newport, R. I., 15 Sept. 1874. He was graduated at Harvard 1829; was admitted to the bar 1832, and rose rapidly to the height of his profession in Boston, Mass. He was appointed to the United States Supreme Court 1851, and in the famous Dred Scott case made a powerful argument dissenting from the court's decision. Resigning in 1857, he was a member of the State legislature for two years; and in 1868 one of the counsel for the defense in the impeachment trial of Andrew Johnson. His writings include ‘Reports of Cases in the Circuit Courts of the United States’ (1854); ‘Decisions of the Supreme Court of the United States, with notes and a digest’; ‘Jurisdiction, Practice, and Peculiar Jurisdiction of the Courts of the United States’ (1880). Consult ‘Memoir and Writings of Benjamin R. Curtis’ (Boston 1880), the first volume of which, containing the memoir, is written by his brother, G. T. Curtis.

CURTIS, Carlton Clarence, American botanist: b. Syracuse, N. Y., 26 Aug. 1864. He was educated at Syracuse and Columbia universities and also studied at the universities of Cambridge and Leipzig. In 1892–94 he was principal of the Fayette Union School, New York, in 1894–96 instructor in natural science at the Brooklyn Polytechnic Institute, from 1898 to 1908 tutor in botany at Columbia, and thereafter associate professor. Besides contributions on professional topics to botanical journals, he is author of ‘Text-Book of General Botany’ (1897); and ‘Nature and Development of Plants’ (1907; 3d ed., 1915).

CURTIS, Charles, American statesman: b. North Topeka, Kan., 25 Jan. 1860. His mother was a full-blooded member of the Kaw tribe of Indians. He was educated in the common schools, and after studying law was admitted to the bar in 1881. In 1884 and again in 1886 he was county attorney of Shawnee County. From 1893 to 1897 he served in Congress from the Fourth Kansas District and from 1897 to 1907 represented the First District of the State. He resigned from the House in 1907 upon his election to the United States Senate to fill the unexpired term of J. R. Burton, resigned, and was the first Indian to hold such office. He was a candidate for re-election in 1912, but was defeated. He was elected, however, for the term 1915–21.

CURTIS, Cyrus Hermann Kotzschmar, American publisher: b. Portland, Me., 18 June 1850. He was educated in the public schools and in 1876 removed to Philadelphia, where he became publisher of the *Tribune and Farmer.* He later established the *Ladies' Home Journal* and made it one of the most successful periodicals in the United States. The Curtis Publishing Company, of which he became head, published, in addition to the *Ladies' Home Journal,* the *Country Gentleman* and the *Saturday Evening Post,* the latter established by Benjamin Franklin in 1728. Under Mr. Curtis's management the *Saturday Evening Post* attained a larger circulation than had hitherto been reached by any American periodical. In 1913 he took over the interest of A. S. Ochs in the Philadelphia *Public Ledger.*

CURTIS, Edward, American medical scientist: b. Providence, R. I., 4 June 1838. He is a brother of G. W. Curtis (q.v.). He was graduated at Harvard in 1859, and took his medical degree at the University of Pennsylvania in 1864. He was an army surgeon during the Civil War and from 1866 was a member of the faculty of the College of Physicians and Surgeons in New York. He made a specialty of microscopic study and the camera in connection with diagnosis, and published a 'Manual of General Medicinal Technology' (1883); 'Months and Moods: A Fifteen-Year Calendar' (1903); 'Nature and Health' (1906).

CURTIS, George Carroll, American geographic sculptor: b. Abington, Mass., 15 July 1872. He was educated at Harvard University, where he was for a time an assistant in the geological department. Later he became assistant field geologist of the United States Geological Survey. He was the first to apply aerial perspective to topographical models; this he did in models of Boston and vicinity, and of the city of Washington as it existed and as it would appear if a proposed development were carried out. A member of the expedition to the West Indian eruptions, he was the first to visit the crater of La Soufrière and discovered the new summit of Mount Pelée. He also spent a year among the coral islands of the south Pacific and in 1910–11 made a special study of the Atlantic coast from Maine to Newfoundland, and in 1913 made a tour of the world studying volcanoes. Besides his special geological and topographical articles, he is author and illustrator of 'A Description of the Topographical Model of Metropolitan Boston' (1900).

CURTIS, George William, American essayist and journalist: b. Providence, R. I., 24 Feb. 1824; d. New Brighton, Staten Island, N. Y., 31 Aug. 1892. At 18 he spent some months at Brook Farm (q.v.) and a few years later visited the Old World, the results of his travels appearing in 'Nile Notes of a Howadji' (1851); and 'The Howadji in Syria' (1852). He was an early sympathizer with the abolition movement and as the editor of *Harper's Weekly* for nearly a generation exercised a measurable influence over the more thoughful of his countrymen. At an earlier period he was editor of *Putnam's Magazine,* which did not prove a financial success, and for many years thereafter he devoted the proceeds of his lecture tours to paying off the obligations incurred in relation to that enterprise. From 1854 till not long before his death he edited the «Easy Chair» department of *Harper's Magazine,* and it is by his «Easy Chair» essays that he is likely to be longest remembered. In these are displayed a gentle persuasiveness of argument and a fund of humor which made them very attractive reading, while the style was at all times polished and graceful. In them he touched upon the varied topics of the day, the lighter as well as the more serious, and since his death several small volumes of selections from them have been published. He was one of the leaders of the Republican party at its outset and in his later years was conspicuous as an advocate of civil service reform and of independent action in politics. He declined offers of diplomatic service abroad. A short time before his death he was made chancellor of the University of New York. As a lecturer and orator he was very popular, and several of his political speeches and orations upon special occasions take high rank among specimens of American oratory. Besides the volumes already named he published 'Lotus Eating' (1852); 'The Potiphar Papers' (1853); 'Prue and I' (1856); 'Trumps' (1862). These are more or less ephemeral in their nature, 'Prue and I' being the only work among them which interests the present generation. His 'Orations and Addresses,' edited by C. E. Norton, appeared in 3 vols., 1893–94. (See ESSAYS FROM THE EASY CHAIR). Consult Cary, Edward, 'George William Curtis' (Boston 1894).

CURTIS, John Ticknor, American lawyer, author and publisher: b. Watertown, Mass., 28 Nov. 1812; d. New York, 28 March 1894. He was graduated from Harvard in 1832, admitted to the bar (Boston, Mass.) in 1836 and practised in Worcester, Mass., and Boston. From 1840 he sat three years in the lower house of the Massachusetts legislature, after which he devoted himself entirely to law and literature. One of his earliest literary productions was a pamphlet advocating State compensation for the destruction by a mob of the Ursuline Convent in Charlestown, Mass. His ability as a patent lawyer gained him the patronage of many distinguished inventors. In 1850 he visited England, where he met the prominent men of the time. On his return he strongly supported the compromise measures of 1850, and in 1857 participated in the famous Dred Scott case in the Supreme Court of the United States, claiming the power of Congress to prohibit slavery. He migrated to New York in 1862, and was engaged in active practice up to his 80th year. He never held any official position beyond his legislative experience of three years in Massachusetts, though he was more than once offered the nomination to a seat on the bench in New York city, and by Daniel Webster the post of Minister to England. Besides many contributions to the press he published a number of authoritative works on law and constitutional history, the more celebrated ones being a 'Digest of Admiralty Decisions in England and America'; a 'Treatise on the Rights and Duties of Merchant Steamers'; 'Origin, Foundation and Adoption of the Constitution' (1854–58); 'Commentaries on the Jurisdiction, Practice and Peculiar Jurisprudence of the Courts of the United States' (1854); 'A Discourse on the Nature of the American Union, as the principal controversy involved in the late Civil War' (1875); 'Life of Daniel Webster' (1869); 'Life of James Buchanan' (1883); 'Treatise on the Law of Patents' (1849); 'Treatise on the Law of Copyright' (1847); 'John Chambers: a Tale of the Civil War in America'; 'John Charaxes'; 'Creation or Evolution.'

CURTIS, Mattoon Monroe, American educator: b. Rome, N. Y., 19 Oct. 1858. He was graduated at Hamilton College, New York, 1880, and from the Union Theological Seminary 1883. He was pastor of a Presbyterian church at Cleveland, Ohio, 1885–88, and in 1891 was elected Handy professor of philosophy in the Western Reserve University. He has published 'Locke's Ethics' (1890); 'Philosophy and Physical Science' (1892); 'Philosophy in America' (1896); 'Kant and Edwards' (1805), etc.

CURTIS, Olin Alfred, American theologian: b. Frankfort, Me., 10 Dec. 1850. He was educated at Lawrence College and Boston University, and at the universities of Leipzig, Erlangen, Marburg and Edinburgh. He served as pastor of Methodist Episcopal churches in Janesville, Wis., 1880–83, Milwaukee 1883–86, and Chicago 1888–89; from 1889 to 1895 was professor of systematic theology at Boston University, and in 1896 accepted the corresponding chair of Drew Theological Seminary. Professor Curtis came to be recognized as perhaps the most distinguished Methodist theologian of his generation. Besides many theological papers, his publications include 'Elective Course of Lectures in Systematic Theology' (1901), and 'The Christian Faith Personally Given in a System of Doctrine' (1905), a work of great importance.

CURTIS, Samuel Ryan, American soldier: b. near Champlain, N. Y., 3 Feb. 1807; d. Council Bluffs, Iowa, 26 Dec. 1866. He was graduated at West Point 1831, but resigned to become a civil engineer. He studied law, was admitted to the bar and practised from 1843–45. He served as colonel in the Mexican War, and was a Republican congressman from his State 1857–61. He was commissioned a brigadier-general 17 May 1861; defeated Generals Price and McCulloch in a decisive engagement at Pea Ridge, Ark., and was promoted major-general 21 March 1862. He subsequently commanded the departments of Missouri (1862–63), of Kansas (1864–65), and of the Northwest (1865); and, becoming United States commissioner in 1865, negotiated treaties with several Indian tribes.

CURTIS, William Eleroy, American journalist: b. Akron, Ohio, 5 Nov. 1850; d. 1911. He was graduated at Western Reserve University in 1871. From 1873 to 1887 he was on the staff of the Chicago *Inter-Ocean*, and by securing interviews with the James brothers, during their contest with Pinkerton's detectives, and in investigating the Ku-Klux-Klan of the South gained a national reputation. He was Washington correspondent of the Chicago *Record* in 1887–1901, when he became associated with the Chicago *Record-Herald*. He was a commissioner of the United States to the Central and South American republics in 1885, and executive officer of the International American Conference of 1889–90. He has written 'Children of the Sun' (1882); 'Capitals of Spanish America' (1888); 'The Land of the Nihilist' (1888); 'Japan Sketches'; 'Venezuela' (1891); 'Life of Zachariah Chandler'; 'The Yankees of the East' (1896); 'To-day in France and Germany' (1897); 'Between the Andes and the Ocean' (1900); 'The True Thomas Jefferson' (1901); 'Denmark, Sweden, and Norway' (1902); 'The Turk and His Lost Provinces' (1902); 'The True Abraham Lincoln' (1903); 'To-day in Syria and Palestine' (1904); 'Modern India' (1905); 'Egypt, Burma, and British Malaysia' (1905), etc. He was director of the Bureau of American Republics 1890–93, and chief of the Latin-American department and historical section of the World's Columbian Exposition 1891–93.

CURTISS, Glenn Hammond, American aviator: b. Hammondsport, N. Y., 21 May 1878. He began life as a newsboy, but was early interested in mechanics. In 1906 at Ormond Beach, Fla., he established the world's record for the fastest mile ever traveled on a motor cycle, making a mile in 26 2/5 seconds. From 1907 to 1909 he was the director of the Aerial Experiment Association of America. He won the *Scientific American* cup in an aeroplane competition at Hammondsport, N. Y. (1908), obtained the international cup in the aeroplane contest at Rheims in 1909, and won a $10,000 prize offered by the New York *World* in a record-breaking flight from Albany to New York 1910. In 1913 he was awarded a medal by the Smithsonian Institution. Besides making a large number of flights in America and in Europe, Curtiss became actively engaged in the commercial side of aviation, being secretary and treasurer of the Curtiss Exhibition Company of New York and president of the Curtiss Aeroplane Company at Hammondsport, N. Y. With the exception of the Wright brothers, none other has done so much as he for aviation in America. He is part author of 'The Curtiss Aviation Book' (1912).

CURTISS, Samuel Ives, American Congregationalist clergyman: b. Union, Conn., 5 Feb. 1844; d. London, England, 22 Sept. 1904. He was graduated at Amherst College 1867, and the Union Theological Seminary 1870; and was pastor of the American chapel in Leipzig 1874–78. In 1878 he was appointed professor of biblical literature in Chicago Theological Seminary, but changed later to the chair of Old Testament literature and interpretation. His publications include a translation of Bickell's 'Outlines of Hebrew Grammar' (1877); 'The Levitical Priests' (1877); translations of Delitzsch's 'Old Testament History of Redemption' (1881); 'Franz Delitzsch' (1890); 'Ezekiel and His Times' (in 'The Bible as Literature' (1896); 'A Plea for a More Thorough Study of the Semitic Languages in America' (1879); 'Moses and Ingersoll' (1881); and 'Primitive Semitic Religions To-Day' (1902), his special study.

CURTIUS, koor'tsĭ-oos, **Ernst,** German Hellenist: b. Lübeck, 2 Sept. 1814; d. Berlin, 12 July 1896. He was educated at Göttingen, Bonn and Berlin, and in 1844 was appointed professor at Berlin and preceptor of the Crown Prince Frederick William, afterward Frederick III. In 1856 he succeeded Hermann as professor at Göttingen, and 1868 was called again to Berlin University. From 1853 Curtius was a member of the Royal Academy of Sciences, and from 1871–93 he was continuously secretary of the philologico-historical section of that institution. Under Imperial commission in 1874 he negotiated with the Greek government in regard to the German excavations at Olympia, begun by him in the following year. He is one of the greatest scholars of modern Germany. Of his works, which mostly relate to Greek antiquities, the best known is his 'History of Greece' (1857–61), translated into English by A. W. Ward (1868–73). Other works by him are 'De Portibus Athenarum' (1842); 'Klassische Studien' (1840); 'Inscriptiones Atticæ XII' (1848); 'Olympia' (1852); 'Die Ionier' (1855); 'Peloponnesos' (1851–52); 'Lectures and Addresses' in three volumes (1895). Consult Gurlitt, 'Erinnerungen an Ernst Curtius' (Berlin 1902); Grimm, 'Ernst Curtius: Ein Brief an seine Freunde' in the *Deutsche Rundschau* Vol. LXXXVIII, Berlin 1896); Curtius, F., 'Ernst Curtius: Ein Lebensbild in Briefen' (Berlin 1903).

CURTIUS, Georg, German philologist and author: b. Lübeck, 16 April 1820; d. Hermsdorf, 12 Aug. 188 He was a brother of Ernst Curtius (q.v.), and in 1849 went to Prague as professor of classical philology, removing five years later to the corresponding chair at Kiel. In 1861 he became professor in Leipzig University and held this post till his death. He was the teacher of many of the foremost philologists of the day. His earliest work was 'De Nominum Græcorum Formatione' (1842); and among many important later ones are 'Grundzüge der griechischen Etymologie' (1858–62), his *chef d'œuvre* translated into English by Wilkins and England; 'Zur Chronologie der Indogermanischen Sprachforschung' (1867); 'Das Verbum der griechischen Sprache' (1873 and 1876); and 'Griechische Schulgrammatik' (1852), the last two having been translated for English students; 'Sprachvergleichung, Beiträge zur griechischen und lateinischen Grammatik' (1846); and in his 'Studien zur griechischen und lateinischen Grammatik' (1868–78) he published not only his own studies, but those of his pupils and others. Consult Sandys, 'A History of Classical Scholarship' (Vol. III, Cambridge 1908); and Platner, 'The Topography and Monuments of Ancient Rome' (2d ed., Boston 1911).

CURTIUS, kėr'shĭ-ŭs, **Mettus**, Roman legendary hero, who, according to tradition, sacrificed himself for the good of his country. In 362 B.C. it is said a chasm opened in the Roman forum, from which issued pestilential vapors. The oracle declared that the chasm would close whenever that which constituted the glory of Rome should be thrown into it. Curtius asked if any thing in Rome was more precious than arms and valor; and being answered in the negative, arrayed himself in armor, mounted a horse splendidly equipped, solemnly devoted himself to death in presence of the Roman people and sprang into the abyss, which instantly closed over him. The lacus Curtius, which marked the spot, has been discovered by the modern archæologist. An altar was erected on the spot and a regular sacrifice offered there.

CURTIUS, Rufus Quintus, Roman historian. He wrote the history of Alexander the Great in 10 books, the first two of which are lost. The exact period in which he flourished is not known; for though his style would indicate that he lived in one of the best periods of the Latin language, no writer of any earlier date than the 12th century has made any mention of his work. His information is inaccurate and the book is, on the whole, unreliable. The style is generally polished and elegant. Modern editions are by Vogel (Leipzig 1884); Dosson (Paris 1887); Hedicke (1908). An English translation by Crosby was published in New York and London (1858). Consult Dosson, S., 'Étude sur Quinte Curce, sa vie et ses œuvres' (1887); Steele, in *Proceedings of the American Philological Association* (Vols. XLIII, LI–LIV, 1912); and the English edition by Heitland and Raven (Cambridge 1889).

CURTIUS, koor'tsē-oos, **Theodor**, German chemist: b. Duisberg, 27 May 1857. He studied at Leipzig, Heidelberg and Munich; in 1886 was lecturer at the University of Erlangen; in 1889 became professor of chemistry at Kiel; in 1897 he went to Bonn, but on the death of Victor Meyer, in the same year, accepted the professorship of chemistry at the University of Heidelberg. He investigated the diazo-compounds of the fats and discovered hydrazine and hydrazoic acid, both compounds of nitrogen.

CURULE MAGISTRATES were the highest dignitaries of the Roman state and distinguished from all others by enjoying the privilege of sitting on ivory chairs (*sellæ curules*) when engaged in their public functions. The curule magistrates were the consuls, prætors, censors and chief ædiles, who, to distinguish them from the plebeian ædiles, were called curule.

CURVES, Higher Plane. A curve can be looked upon in many ways; geometrically as the intersection of two surfaces, as the locus of a moving point, or envelope of a moving line; analytically as a representation of an equation in point- or line-co-ordinates, and therefore as yielding a singly infinite system of points or lines. But if this view be adopted, the "curve" must not necessarily be regarded as identical with the system of points; for most curves (not all) have tangents, hence a curve yields also a system of lines, of equal importance with the system of points; a definition that lays stress on one system to the exclusion of the other is incomplete. This was recognized by Plücker ('Theorie der algebräischen Curven,' 1839, p. 200), in his statement of the dual generation of a curve: "If a point continually moves along a straight line, while the line continually rotates about the point, one and the same curve is enveloped by the line and described by the point." Clifford ('Math. Papers,' pp. 40–42) treats the true curve as an undefined entity, of which the assemblages of points and lines are two distinct manifestations. The present tendency is toward this view, at least as regards an algebraic curve — a curve whose equation, whether in point- or line-co-ordinates, is algebraic. A curve whose Cartesian equation cannot be reduced to an algebraic form, e.g., $y = \sin x$, is non-algebraic or transcendental. It is convenient to treat first of algebraic curves.

If x, y satisfy an algebraic equation $f(x, y) = 0$, it can be shown that $\frac{dy}{dx}$ has a definite value $\left(= -\frac{\partial f}{\partial x} : \frac{\partial f}{\partial y}\right)$ unless both $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$ vanish. There is therefore a tangent, $Y - y = (X - x)\frac{dy}{dx}$, i.e., $(X - x)\frac{\partial f}{\partial x} + (Y - y)\frac{\partial f}{\partial y} = 0$; in homogeneous co-ordinates

$$X\frac{\partial f}{\partial x} + Y\frac{\partial f}{\partial y} + Z\frac{\partial f}{\partial z} = 0.$$

The co-ordinates of the tangent are: $\xi : \eta : \zeta = \frac{\partial f}{\partial x} : \frac{\partial f}{\partial y} : \frac{\partial f}{\partial z}$; the elimination of x, y, z from these equations and $f(x, y, z) = 0$ gives an algebraic equation $\phi(\xi, \eta, \zeta) = 0$, the line equation (tangential equation) of the curve. Thus the curve has two equations, both algebraic, a point equation of degree m, a line equation of degree n; these two numbers m, n, the order and class of the curve, are the number of points that lie on an arbitrary line, the number of tangents that pass through an arbitrary point; they belong respectively to the point system and the line system, not to the curve itself. A number that is more intimately associated with the curve is the genus, p, to be defined later.

An algebraic curve cannot break off; the tangent cannot suffer a sudden change in direction; no finite part of the curve can coincide with a straight line. Thus the normal character of an arc of an algebraic curve expresses gradual and continuous change of position (motion of point), gradual and continuous change of direction (motion of tangent), as stated by Plücker.

The number of terms in the equation $f(x, y, z)=0$ is $\frac{1}{2}(m+1)\ (m+2)$; the number of disposable constants is therefore $\frac{1}{2}(m+1)(m+2)-1$, i.e., $\frac{1}{2}m(m+3)$. Hence passage through $\frac{1}{2}m(m+3)$ arbitrary points determines the curve; while if the curve passes through $\frac{1}{2}m(m+3)-q$ arbitrary points, the coefficients can be expressed linearly in terms of q parameters, and the curve has q degrees of freedom. If the points are not arbitrary, the curve may have mobility greater than q, or it may break up into curves of lower order. The theory is really that of the intersections of curves. Two curves of orders m, m' intersect in mm' points, for the elimination of z from the equations produces an equation of degree mm' for $x:y$. The m^2 intersections of two m-ics, u, v, do not determine an m-ic (although $m^2 > \frac{1}{2}m(m+3)$), for all curves $u+kv=0$ pass through the points; the m^2 points impose precisely $\frac{1}{2}m(m+3)-1$ conditions. Similarly, the mm' intersections of C_m and $C_{m'}$ do not impose independent conditions on all curves; e. g., the 20 intersections of C_4 and C_5 impose 14 conditions on a quartic, 17 on a quintic, 19 on a sextic, but 20 on all higher curves. The most convenient statement is: the quartic excess is 6, the quintic excess is 3, the sextic excess is 1 (Macaulay). The first notice of theorems of this character is due to Maclaurin (1720); the first explanation was given by Euler and Cramer (1748–50). From these has arisen the whole modern theory of groups of points on a curve (geometry on a curve). (Scott, 'Bull. Am. Math. Soc.,' 2d series, v. 4, pp. 260–273; 1897–98).

The fundamental theorem is the Cayley-Bacharach theorem (1843, 1886); a C_n through all except $\frac{1}{2}(l+m-n-1)(l+m-n-2)$ of the intersections of Cl and C_m will pass through the remainder unless these lie on a curve of order $l+m-n-3$. In particular *if* $(l=n)$, precisely $\frac{1}{2}(m-1)(m-2)$ of the intersections of a fixed C_m by a variable C_n are a consequence of the rest if $n > m-3$; but if $n \leqq m-3$, fewer than $\frac{1}{2}(m-1)(m-2)$ are a consequence. Thus no matter what the order of the cutting curve, the number of the induced intersections can never exceed $\frac{1}{2}(m-1)$ $(m-2)$. This number, which limits the interconnection of points on the curve of order m, is called the genus of the curve, and is usually denoted by p. The genus of a quartic, e. g., is 3; 3 points on a quartic follow from 5 intersections with a conic, or from 9, 13, 17 intersections with a cubic, quartic or quintic, and so on.

If a curve has multiple points, corresponding theorems hold and preserve their significance, provided the cutting curve is an adjoint curve, that is, a curve with a multiple point of order $k-1$ where the fixed curve has a multiple point of order k. The genus, the number p which limits the interconnection, is in this case $\frac{1}{2}(m-1)(m-2)-\frac{1}{2}\Sigma k(k-1)$. (Macaulay, 'Proc. Lond. Math. Soc.,' v. 26, pp. 495–544; 1895; Hardcastle, F., 'Report on Point-Groups,' in progress in Proc. of the Brit. Assoc.; Brill-Noether Bericht, 'Die Entwicklung der Theorie der algebräischen Functionen in älterer und neuerer Zeit' (1894).

Multiple points arise when two or more points of the system occupy the same position in the plane; according to the number of points that coincide, the point is double, triple, etc. Double points (dps) are nodes or cusps; a node is the coincidence of two non-consecutive points, a cusp is the coincidence of two consecutive points; similarly double tangents are either bitangents or inflexional tangents. The cusp and inflexional tangent are also called stationary point and line, on account of the effect of the singularity on the motion of the point and line by which the curve is described.

The coincidence of two points at P causes an arbitrary line through P to meet the curve in two points there; hence if P be taken as origin, the terms of the first degree in the equation will vanish. The conditions for a double point at x, y, z are therefore the vanishing of $f, \frac{\partial f}{\partial x}, \frac{\partial f}{\partial y}$ (in homogeneous co-ordinates, of $\frac{\partial f}{\partial x}, \frac{\partial f}{\partial y}, \frac{\partial f}{\partial z}$). Two lines can be found to meet the curve in more than two points at P; these are the tangents; they are given by the terms of degree 2 equated to zero. Similarly the conditions for a k-point are the vanishing of the $\frac{1}{2}k(k+1)$ derivates $\frac{\partial^{k-1} f}{\partial x^{\alpha}\partial y^{\beta}\partial z^{\gamma}}$ $(\alpha+\beta+\gamma=k-1)$, and there are k tangents, lines which meet the curve in more than k points.

If the tangents at a dp are distinct, the point is a node, formed by the crossing of two simple branches, real or imaginary according as the tangents are real or imaginary. In this last case, the point is detached from the main body of the curve, and is called an isolated point, or acnode, the visible crossing being called a node, or crunode. If the tangents are coincident, and meet the curve in precisely three points, the point is a cusp; if the coincident tangents meet the curve in more than three points, the singularity is complex.

Elimination of $x:y:z$ from $\frac{\partial f}{\partial x}=0$ $\frac{\partial f}{\partial y}=0$. $\frac{\partial f}{\partial z}=0$ gives a condition, $D=0$, to be satisfied by the equation of any curve that has a dp. Hence a general locus of order m has no point-singularities, and a general envelope of class n has no line-singularities. But a general envelope has point-singularities and a general locus has line-singularities; for the direction of a tangent, given by the value of $\frac{dy}{dx}$, is unchanged if $\frac{d^2y}{dx^2}=0$, i.e., if

$$\frac{\partial^2 f}{\partial x^2}\left(\frac{\partial f}{\partial y}\right)^2-2\frac{\partial^2 f}{\partial x\partial y}\cdot\frac{\partial f}{\partial x}\cdot\frac{\partial f}{\partial y}+\frac{\partial^2 f}{\partial y^2}\left(\frac{\partial f}{\partial x}\right)^2=0\cdot$$

This condition, and $f=0$, are only two equations, and consequently no condition is imposed on the locus by the existence of line-singularities.

If a curve of order m, class n, has ν nodes, κ cusps, τ bitangents, ι inflexional tangents, these numbers are connected by Plücker's equations. The tangent at x, y, z is

$$X\frac{\partial f}{\partial x}+Y\frac{\partial f}{\partial y}+Z\frac{\partial f}{\partial z}=0;$$

this passes through x', y', z' if x, y, z lie on the curve $x'\frac{\partial f}{\partial x}+y'\frac{\partial f}{\partial y}+z'\frac{\partial f}{\partial z}=0$, the polar of x', y', z' with respect to f. Since this curve, $\Delta f=0$, is of order $m-1$, it meets f in $m(m-1)$ points; two of these lie at every node, three at every cusp; hence the number of tangents from x', y', z' is

$$n=m(m-1)-2\nu-3\kappa. \quad . \quad . \quad . \quad (1)$$

Similarly from the line-equation,

$$m=n(n-1)-2\tau-3\iota. \quad . \quad . \quad . \quad (1')$$

The condition that the tangent at x, y, z be stationary becomes in homogeneous co-ordinates

$$\begin{vmatrix} \frac{\partial^2 f}{\partial x^2} & \frac{\partial^2 f}{\partial x\,\partial y} & \frac{\partial^2 f}{\partial x\,\partial z} \\ \frac{\partial^2 f}{\partial x\,\partial y} & \frac{\partial^2 f}{\partial y^2} & \frac{\partial^2 f}{\partial y\,\partial z} \\ \frac{\partial^2 f}{\partial x\,\partial z} & \frac{\partial^2 f}{\partial y\,\partial z} & \frac{\partial^2 f}{\partial z^2} \end{vmatrix}=0;$$

the point of contact must lie on this curve, $H(f)=0$, the Hessian of f, of order $3(m-2)$. At a node on f, H has a node with the same tangents; at a cusp, H has a triple point, composed of two branches touching the cuspidal tangent with one branch cutting it; the numbers of intersections are 6 and 8. Hence

$$\iota=3m(m-2)-6\nu-8\kappa, \quad . \quad . \quad . \quad (2)$$

and reciprocally

$$\kappa=3n(n-2)-6\tau-8\iota. \quad . \quad . \quad . \quad (2')$$

Any one of these four equations can be obtained algebraically from the others. From these we can find also (3 and 3′) expressions for τ in terms of m, ν, κ, and for ν in terms of n, τ, ι.

These six are Plücker's equations; three only are independent. It must not however be supposed that we can choose any three of the numbers arbitrarily. There is a limit to the number of dps that a proper curve can have; $\nu+\kappa > \frac{1}{2}(m-1)(m-2)$. For if the curve had one more, a curve of order $m-2$ could be passed through the dps and $m-3$ other points on the curve; but this would have with f intersections in number $2[\frac{1}{2}(m-1)(m-2)+1]+m-3$; i.e., $m(m-2)+1$, which is impossible. A curve can actually have this number of dps; it is then called rational (or unicursal), because the co-ordinates of any point can be expressed rationally in terms of a parameter, as follows: The dps and $m-3$ other points on f determine $(m-2)$-ics with one degree of freedom, a system $u+kv=0$. Of the $m(m-2)$ intersections of one of these with f, all except one are at the fixed points; the co-ordinates of the one remaining variable intersection are therefore given rationally in terms of the parameter k by $f=0$, $u+kv=0$.

If the curve has not this number of dps, let it have $\delta\ (=\nu+\kappa)$; the number $\frac{1}{2}(m-1)(m-2)-\delta$, which has already been given as the genus, was originally called the deficiency of the curve (Cayley).* From Plücker's equations we find

$$\tfrac{1}{2}(m-1)(m-2)-\nu-\kappa=\tfrac{1}{2}(n-1)(n-2)-\tau-\iota,$$

i.e., the point deficiency and the line deficiency are equal; the deficiency (or genus) does not belong specially to the point system or the line system. In particular, if the curve is rational quâ locus, it is rational quâ envelope. If we introduce p for the genus, the equations assume a convenient form,

$$n+\kappa=2m+2(p-1),\quad m+\iota=2n+2(p-1),$$
$$m(m-3)-2(\nu+\kappa)=2(p-1)=n(n-3)-2(\tau+\iota).$$

There are other limitations on these numbers, but the theory is not complete. Clebsch proved (Crelle, v. 64, p. 51; 1864) that the number of cusps on a rational curve cannot exceed $\frac{3}{2}(m-2)$; the more general question as to the maximum number of cusps for a curve of assigned order awaits solution.

So far the singularities have been supposed to be simple. A multiple point of order higher than the second is, in a certain sense, equivalent to a number of simple singularities. If the tangents at a k-point are distinct, the point arises from the crossing of k branches; these cause $\frac{1}{2}k(k-1)$ intersections, nodes by the geometrical definition. It can be shown that such a point reduces the class of the curve, the number of inflexions, and the genus, by $2\times\frac{1}{2}k(k-1)$, $6\times\frac{1}{2}k(k-1)$, $\frac{1}{2}k(k-1)$ respectively. Thus not only is the point explained geometrically by $\frac{1}{2}k(k-1)$ nodes, but as regards Plücker's equations it is equivalent to these nodes. Nevertheless the point cannot be replaced by these nodes for all purposes, e.g., as regards the number of conditions; the k-point imposes $\frac{1}{2}k(k+1)$ conditions, whereas the nodes would impose $\frac{3}{2}k(k-1)$, i.e., $\frac{1}{2}k(k+1)+k(k-1)$. It is an important fact that this equivalence does hold as regards the conditions imposed on adjoint curves; the presence of the $(k-1)$-point on the adjoint imposes $\frac{1}{2}k(k-1)$ conditions, equal to the number that would be imposed on the adjoint by $\frac{1}{2}k(k-1)$ separate nodes on f.

If the tangents are not distinct, the matter may become very complicated. The multiple point immediately revealed by the equation may be but one of a series of multiple points indefinitely close together, and the singularity then involves also multiple tangents. The determination of the point- and line-components, the "analysis of higher singularities," has received much attention. If the singularities are regarded as singularities of the equation, the question is properly considered from the algebraic standpoint. At an ordinary point of the curve, y can be expanded in an ascending series of positive integral powers of x, provided $x=0$ is not the tangent; at a k-point the process is not directly applicable, it requires some modifications, and then leads to k expansions, with exponents either integral or fractional. An expansion with fractional exponents, whose L.C.D. is q, is accompanied by the $q-1$ conjugate expansions, thus forming a cycle of order q (Puiseux). The integral expansion is a cycle, $q=1$, and the k-point is represented by a number of cycles of orders $q_1, q_2, q_3, \ldots$ where $\Sigma q=k$. The number of cusps in a cycle is $q-1$; this agrees with the known facts about the simple cusp ($y=x^{\frac{3}{2}}$, $y=-x^{\frac{3}{2}}$), and is accepted as the algebraic definition of cusps. The algebraic definition of a node is indirect; ν is determined so that $2\nu+3\kappa$ shall be equal to twice the total number of intersections of all the branches (the discriminantal index of the singularity); it is proved that this definition yields always a positive integral value for ν. (Chrystal, 'Algebra,' v. 2, 1889, pp. 359–371; Harkness and Morley, 'Treatise on the Theory of Functions,' 1893, pp. 127–151; Brill-Noether Bericht, pp. 367–402 for full references; 'Die Entwicklung der Theorie der algebräischer Functionen in älterer und neuerer Zeit' 1894).

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*During the last 30 years the whole theory of plane algebraic curves has been modified in important points by the influence of the theory of functions; in particular, this has shown the significance of the genus.

The process as outlined above, dealing with the expansions as a whole, simply enumerates the components, algebraically defined, of a singularity; it affords no clue to the structure. This structure can however be put in evidence by means of the critical exponents of the expansions, those in whose denominators a new factor appears. These show that the dps are combined into certain multiple points, and thus they lead to an algebraic description of the singularity. (Smith, H. J. S., 'Proc. Lond. Math. Soc.,' v. 6, pp. 153–182; 1876; Halphén, 'Mém. prés. à l'Ac. des Sc. de Paris,' v. 26, 1877; Zeuthen, 'Math. Ann.,' v. 10, pp. 210–220, 1876). A different treatment of the expansions, due to Noether, gives a clearer idea of the structure.

By a geometrical process, depending on the simplest Cremona transformation (see below), it is possible not only to enumerate the multiple points and lines contained in any singularity, but also to construct a penultimate form to indicate the arrangement of these components. (Scott, 'Am. J. Math.,' v. 14, pp. 301–325; v. 15, pp. 221–243; 1892–93).

The various processes lead to the following conclusions as to the content of a complex singularity. The point-equation by its lowest terms gives the order, k, of the singularity; the line-equation gives the class, l. If the singularity has all its tangents coincident (if it has not, it can be broken up into simpler ones) then order + class = number of intersections with the tangent at the point, and thus the class is known without reference to the line-equation. Coincident tangents may lead to other multiple points, or to chains of multiple points, contained in the singularity; if the total number of dps in these is h, the singularity has h latent double points. It has also latent double lines, h' in number, and it has been proved that $h'=h$. The singularity of order k, class l, excess h (supposed irreducible), involves $\frac{1}{2}k(k-1)+h$ dps, of which $k-1$ are cusps, and $\frac{1}{2}l(l-1)+h$ dls, of which $l-1$ are inflexional tangents. The singularity is equivalent to those components as regards Plücker's equations and as regards the genus; but not in the number of conditions imposed on the curve.

It is obvious that the multiple points of a curve cannot always be chosen arbitrarily. A sextic, e.g., can have 10 dps; but these, chosen arbitrarily, would impose 30 conditions, whereas 27 determine the sextic. The 27 conditions cannot be imposed by 9 dps arbitrarily chosen, for these would determine only the reducible sextic $v^2=0$, where v is the cubic through the 9. If the 9 admit of a proper sextic, $u=0$, they allow one degree of freedom, for all curves $u+kv^2=0$ satisfy the conditions. Hence the 9 are not arbitrary. The theorems of geometry on a curve, and linear systems of curves, lead to general results of this character, but there are evidently many special theorems as to the position of singularities to be formulated for curves of specified order or class.

By means of a birational transformation, either of the whole plane or of the one curve, it is possible to change any curve into one, in general of different order, with no point-singularities except simple nodes. Let P, (x, y, z) become P', (x', y', z') (represented on a second plane for distinctness), where x', y', z' are given by

$$x':y':z'=\phi_1(x, y, z):\phi_2(x, y, z):\phi_3(x, y, z);$$

then corresponding to any point P of the first plane II there is one point P' of the second plane II'; but the converse does not hold. The ∞^2 straight lines of II', $lx'+my'+nz'=0$, correspond to the ∞^2 transformation-curves in II, $l\phi_1+m\phi_2+n\phi_3=0$, of order σ; to a single point P' of II', given as the intersection of two lines, there correspond in II all the κ variable intersections of two ϕ's, $P_1, P_2, \ldots, P_\kappa$; the correspondence of the two planes is said to be "κ-to-one," $(\kappa, 1)$. Since the ϕ's may have fixed points, simple or multiple, $A_1, A_2, \ldots$ of orders $\rho_1, \rho_2, \ldots$, κ may be less than σ^2.

If $\kappa=1$, i.e., if one point of II corresponds to one point of II', the equations of transformation are reversible; not only is II' expressed rationally in terms of II by these equations, but also II is expressed rationally in terms of II' by

$$x:y:z=\psi_1(x', y', z'):\psi_2(x', y', z'):\psi_3(x', y', z'),$$

the reverted equations, which are of the same order σ. The transformation is a birational transformation of the *plane*, usually called a Cremona transformation. In the simplest Cremona transformation the ϕ's are conics through three fixed points; the equations of transformation are therefore of the second degree; this is a reversible quadratic transformation. An important theorem is that every Cremona transformation can be accomplished by a succession of these reversible quadratic transformations.

If $\kappa>1$, the equations cannot be reverted; the transformation is not birational for the whole plane. But if P_1 trace a curve F, P' traces the corresponding curve F'; the points $P_2 \ldots P$ trace some curve, f (different from F), the companion curve of F. If we ignore all of II except F, that is, if we confine ourselves to the two curves F, F', the correspondence becomes one-to-one; with the help of the equation $F=0$ the equations of transformation can be reverted, and the transformation becomes birational. Such a birational transformation of a *curve* is called a Riemann transformation. Thus a Riemann transformation is birational for the one curve only, while a Cremona transformation is birational for the whole plane, and therefore for every curve in the plane.

The importance of transformation is due to its effect on singularities. The fixed points $A_1, A_2, A_3, \ldots$ in II have no correspondents in II', but a point close to A_i in a determinate direction has a determinate correspondent, and if a point describes a small circuit about A_i, the corresponding point in II' describes a curve a_i', rational and of order ρ_i; this is a fundamental curve of the second plane. If F passes k times through A_i, F' cuts a_i' in k points; if the k directions through A_i are distinct these points are all separate, and thus the multiple point on F is dissipated. If any of the k tangents at A_i coincide, F' has contact with a_i', or it may have a multiple point on a_i' but of a less complex character than the original at A_i; and by repetitions of the process the singularity is made to disappear.

But new singularities may arise, due to fundamental curves in the first plane. Such fundamental curves might be defined by means of the reverted equations of transformation; but as it is not usually convenient actually to form these (at least in the case of a Riemann transformation), it is simpler to adopt an independent definition. An irreducible curve β that meets the transformation curves ϕ only at their fixed points is a fundamental curve of the system; all points on such a curve, β, correspond to a single point B' of Π', or, more precisely, to points close to B' in different directions. If then F meets β in h points, F' has at B' a multiple point of order h.

Finally, new multiple points, in general only simple nodes, arise on F' owing to the passage of F through associated points of the first plane (intersections of two ϕ's). Such passages are indicated by intersections of F with its companion curve f; hence they are in general inevitable.

By either transformation, Cremona or Riemann, the multiple points on the given curve can be dissipated, whether the tangents are distinct or coincident. A Cremona transformation-system, however, always has fundamental curves, whose number is equal to that of the fundamental points (Bertini, 'Palermo Rendiconti,' v. 3, pp. 5–21, 1889); hence when F is transformed, new multiple points, possibly of high order, will arise unless the Cremona system is specially chosen. A Riemann transformation-system, on the contrary, need not have any fundamental curves, hence in general the new multiple points that arise will be simple nodes. A Riemann transformation, however, requires the elimination of $x:y:z$ from the equations of transformation, of degree σ, together with $F=0$, of degree m; whereas a Cremona transformation is accomplished by the direct substitution of $\psi_1(x', y', z')$, $\psi_2(x', y', z')$, $\psi_3(x', y', z')$ for x, y, z. (Salmon, 'Higher Plane Curves,' chap. 8 in the German translation by Fiedler; also references at end; Scott, 'Quart. Jour.,' v. 29, pp. 329–381, 1898; v. 32, pp. 209–239, 1900).

When a curve is subjected to a birational transformation of either kind, Cremona or Riemann, the induced points of a group of intersections transform into the induced points of the transformed group; this affords one proof (Bertini) of the important theorem that two curves which are birationally connected are of the same genus. The converse is not true; curves of the same genus cannot necessarily be birationally transformed into one another. A curve of genus p depends in general on $3(p-1)$ characteristic constants, the so-called moduli; if these are equal for two curves, then the two are birationally equivalent. (Clebsch-Lindemann, 'Vorlesungen über Geometrie,' 1876, pp. 709–720).

Closely connected with this is the transformation of a curve into itself. This however is more conveniently considered as an independent theory, that of correspondence of points on a curve. (Cayley, 'Proc. Lond. Math. Soc.,' 1865–66; no. 385, v. 6, Coll. Papers; 'Phil. Trans.,' 1867–68; no. 407, v. 6, Coll. Papers; Brill, 'Math. Ann.,' v. 36, pp. 321–360, 1890; Brill-Noether Bericht, pp. 530–531).

An entirely distinct class of investigations deals with the form of curves (topology, analysis situs). The method employed is usually variation of the coefficients, by which the curve is derived from a known reducible curve of the same order. In this manner Klein proved ('Math. Ann.,' v. 10, pp. 199–209, 1876) that the numbers of the real singularities are connected by the relation

$$m + I + 2T' = n + K + 2A',$$

where I, K, T', A' are the numbers of real inflexions and cusps, isolated tangents and isolated points, on a curve of order m, class n. Hence if the curve has no point-singularities, $I + 2T' = m(m-2)$, from which it follows, since $i = 3m(m-2)$, that not more than one-third of the inflexions of a non-singular locus can be real. Klein's relation has been proved algebraically by Brill ('Math. Ann.,' v. 16, pp. 348–408, 1880), and extended to complex singularities. There is no corresponding restriction on the bitangents; all may be real.

Topological theorems relate in general to the nature, number and arrangement of the distinct parts (circuits) of a curve. The first division of circuits, due to von Staudt, is into odd and even, for the number of real intersections with an arbitrary line is always odd or always even. An odd circuit necessarily extends through infinity. Simple examples are the oval and the infinite branch of a bipartite cubic $y^2 = (x-a)(x-b)(x-c)$; but circuits may be much more complex. Let the minimum number of real intersections with a straight line be called the index of the circuit. Zeuthen showed ('Math. Ann.,' v. 7, p. 426, 1874) that a quartic may have a circuit of index 2, with two nodes; Cayley showed ('Phil. Mag.,' v. 29, 1865; no. 361, v. 5, Coll. Papers) that a sextic may have a circuit of index 2, without multiple points. It has been proved (Scott, 'Trans. Am. Math. Soc.,' v. 3, pp. 388–398, 1902) that for every order m there exists a curve ($p = 0$ or 1), composed of a single circuit of index $m-2$, or $m-4$, $m-6$, down to 0 or 1, according as m is even or odd; any such circuit of index k can be produced by a simple process of linking from k odd circuits. The Zeuthen quartic circuit finds its place in this category; it is due to the linking of two odd circuits; but the non-singular sextic circuit is entirely different in character, and a general theory of such circuits is still to be suggested.*

The possible number of circuits is $p + 1$. (Harnack, 'Math. Ann.,' v. 10, pp. 189–198, 1876); for every order m there exist curves with this maximum number of circuits, and with every smaller number.

The question of arrangement has been considered only with reference to circuits that can be projected into the finite circuits, the so-called ovals. Hilbert ('Math. Ann.,' v. 38, pp. 115–138, 1891) discussed curves with "nested ovals," whose simplest type is the annular quartic, composed of one oval inside another; the number of nested branches cannot exceed $\frac{1}{2}(m-2)$ or $\frac{1}{2}(m-3)$, according as m is even or odd; moreover, non-singular curves with the maximum number of circuits and the maximum number of nested ovals do exist.

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*For connection with symmetric Riemann surfaces consult Klein, 'Math. Ann', v. 7, pp. 558–566, 1874; v. 10, pp. 415, 416, 1876; über Riemann's 'Theorie der algebraischen Functionen und Ihrer Integrale,' 1882; pp. 60–69 in F. Hardcastle's translation, 'Lectures on Mathematics' 'The Evanston Colloquium' 1894, pp. 30–32; Harkness and Morley, 'Treatise on the Theory of Functions,' pp. 274–276.

Hilbert draws attention to the arrangement of the 11 ovals of a non-singular sextic ($p=10$); he states that one of these must lie inside another (p. 118). It appears highly probable (V. Ragsdale, 'Bull. Am. Math. Soc.,' v. 11, p. 464, 1905) that this unproved theorem of Hilbert's is the simplest case of a general law in accordance with which at least $\frac{1}{2}(q-1)(q-2)$ of the circuits of a non-singular curve of order $2q$ must lie inside some of the remaining $q^2+\frac{1}{2}(q-1)(q-2)$.

Thus as regards circuits the only question completely solved is that of the possible number; their nature, their arrangement as regards one another, or as regards the straight lines of the plane (on which depends the answer to the inquiry whether all the even circuits can be projected simultaneously into the finite), have been hardly touched upon, though there must be many interesting results awaiting discovery.

Although the general theory of polars belongs properly to the theory of algebraic forms, it supplies convenient expression for some geometrical facts. The first polar of x', y', z' is the curve of order $m-1$, $\Delta f=0$, where Δ denotes the operator $x'\frac{\partial}{\partial x}+y'\frac{\partial}{\partial y}+z'\frac{\partial}{\partial z}$. A second operation with Δ produces the second polar, $\Delta^2 f=0$, of order $m-2$, and so on; thus any point has $m-1$ polars, of which the last two are the polar conic and polar line. The polar conic of a dp is simply the pair of tangents; the polar conic of an inflexion consists of the inflexional tangent together with another line which does not pass through the inflexion; thus in both cases the polar conic has a dp. It is easily proved that if the polar conic of B has a dp A, the first polar of A has a dp B. This suggests three derived curves: the locus of points A, the Steinerian, of order $3(m-2)^2$; the locus of points B, the Hessian, of order $3(m-2)$; the envelope of the line AB, the Cayleyan. Thus, e.g., the curve by which the points of inflexion are determined, the Hessian, is geometrically defined; every point is in a known geometrical relation to f. On the other hand, though it is known that a curve of order $(m-2)(m^2-9)$ can be passed through the points of contact of the bitangents, no geometrical definition of any such curve has yet been formulated. The curve is of course not unique; what is needed is a geometrical definition of some one curve that shall meet f only at these points of contact, and at the multiple points, in such a manner as to account for the whole number of intersections. (Cayley, 'Coll. Papers,' v. 11, pp. 471, 473).

The metric properties of a curve are important in particular questions, though not in the general theory. The curve has m points at infinity; at each of these there is a tangent, which is an asymptote unless it lies entirely at infinity. Consequently for every non-repeated direction to infinity there is an asymptote; for a repeated direction there may or may not be asymptotes. A twofold direction, e.g., may be accounted for either by contact with the straight line at infinity, with no asymptote, or by a dp at infinity, with two asymptotes, distinct or coincident. A branch that has a real asymptote is called hyperbolic; a branch that has contact with the straight line at infinity, whether at a single point or at a multiple point, is called parabolic.

The curve has n imaginary tangents from each of the circular points; these by their intersections determine the n^2 foci, of which n are real (Plücker's definition, 1833); but the number of foci is diminished if the curve passes through the circular points or touches the straight line at infinity.

There is a theory of diameters; these are the polars of points at infinity. The polar line of a point at infinity is the locus of the mean centre of the m intersections of the curve with chords through the point (proved by Newton for cubics); this property of a diametral line is analogous to the bisection property of a diameter of a conic. The other polars (curvilinear diameters) also can be explained in terms of the segments of the chords. (Salmon, H. P. C., chap. 4).

The first enumeration of varieties of a curve of any order beyond the second is Newton's 'Enumeratio linearum tertii ordinis' (1706). He proves that all the 72 varieties (it should be 78) can be obtained by projection from the five types of cubic with an inflexional tangent at infinity (divergent parabolas), bipartite, unipartite, crunodal, acnodal and cuspidal. Similarly when once the distinct types of a curve of any order have been enumerated, the varieties can be obtained at once. There are 144 types of quartic (R. Gentry, 'On the forms of plane quartic curves,' 1896); the number for higher curves, even for quintics, must be very great. It does not appear that any special purpose would be served directly by the enumeration of these, though there are matters of interest on which this might throw light. For example, the theory of the inflexional tangents of a cubic has been thoroughly worked out; suitably taken in threes they determine three inflexions on a straight line; the three tangents and this line form a framework for the curve. As regards quartics, a closely corresponding theory is that of the bitangents; suitably taken in fours, these determine sets of eight points on the quartic, each set lying on a conic; the curve is conveniently referred to the four bitangents and the conic. What is the generalization of this? Even for the quintic, this is as yet unknown.

A more profitable classification of curves is according to their genus, and the values of the $3(p-1)$ characteristic constants, or moduli. Rational ($p=0$), elliptic ($p=1$), and hyperelliptic curves (which include among others all curves with $p=2$) have been extensively treated (Clebsch-Lindemann, pp. 883–903, 903–915, 915–923; also 711–712, 717–720; Loria, 'Il passato ed il presente delle principali teorie geometriche,' 2d edition, 1896, pp. 76–79 for references).

Investigations on special classes of algebraic curves are too numerous to mention; in particular, bicircular quartics and cartesians (with nodes, or cusps, at the circular points) have a literature to themselves. The Steiner curve, or deltoid (hypocycloid with three cusps), is perhaps the most interesting individual among algebraic curves, on account of its geometrical properties. (Loria, 'Il passato,' etc., pp. 61–76).

. If a curve has an equation that cannot be expressed in finite algebraic form it is said to be transcendental. Algebraic and transcendental curves, however, are by no means as widely separated as this would suggest; e.g., the equation $r=\sin b\vartheta$ represents curves which are algebraic when b is rational, transcendental for all other values of b. Thus the algebraic curves of the series bear to the whole series the relation that is borne by rational numbers to all numbers; they are isolated members, whose number is insignificant. The same is probably true of all algebraic curves; they are isolated members of transcendental families. It is not surprising, therefore, that there is as yet no general theory of transcendental curves. Results proved for algebraic curves by means of the whole equation (e.g., Plücker's equations) are not applicable to transcendental curves, which from one point of view are of infinite order; while results that depend only on a small arc are in general applicable. Such knowledge as we have of transcendental curves is obtained from metric investigations of special curves.

Among these special curves, one of the most important divisions is that of roulettes. A roulette is traced by a point attached to a curve, which itself rolls without sliding on a fixed curve. A point on the circumference of a circle which rolls on a straight line traces a cycloid; if the circle rolls in or on a circle the roulette is an epicycloid or hypocycloid. If the point is not on the circumference of the rolling circle, the curve is a trochoid, epitrochoid or hypotrochoid. The epicycloid or hypocycloid is algebraic if the radii of the two circles are commensurable. An important theorem, due to Descartes, is that the normal to a roulette at any point passes through the corresponding point of contact of the rolling curve with the fixed curve.

Some of the best known of the transcendental curves are the spiral of Archimedes, $r=a\vartheta$; the hyperbolic spiral, $r\vartheta=a$; the logarithmic spiral, $r=a\vartheta$, which cuts all its radii vectores at a constant angle; the logarithmic curve, $y=a^x$, or $x=m\log y$, which is noteworthy on account of the curious discontinuity of the negative branch (Salmon, H. P. C., chap. 7); the catenary, $y=\frac{c}{2}\left(e^{\frac{x}{c}}+e^{-\frac{x}{c}}\right)$ the form assumed by a chain hanging from two points of support; the tractrix, $x=c\log\frac{c+\sqrt{c^2-y^2}}{y}-\sqrt{c^2-y^2}$, which cuts all the tangents to the catenary orthogonally; this curve is of special interest on account of the use made of it by Beltrami ('Saggio d'interpretazione della geometria non-euclidea,' 1868). (For detailed references consult Loria, 'Spezielle algebräische und transscendente ebene Kurven,' trans. by Schütte, 1902).

All the curves hitherto mentioned have tangents, which vary continuously from point to point; but there are curves, graphical representations of certain functions, which differ in this respect. A curve may have a tangent at every point, which yet may not vary continuously; *e.g.*, "polygonal lines," $y=\int_0^x f(x)\,dx$, where $f(x)$ is a certain arithmetic function; such a curve is composed of a number of segments of straight lines. (Gravé, 'Compte-rendus,' v. 127, pp. 1005–1007, 1898).

There are curves which are continuous, and yet have no definite tangents; the classic example, due to Weierstrass, is $y=\sum_{n=0}^{n=\infty} b^n \cos a^n x\pi$, (Wiener, 'Crelle,' v. 90, pp. 221–252, 1881). The explanation of the impossibility of assigning the tangent at any point is that in any finite interval the curve makes an infinity of oscillations.

Another possible deviation from the natural idea of a curve was discovered by Peano ('Math. Ann.,' v. 36, pp. 157–160, 1890). He shows that it is possible to construct functions $\phi(t)$, $\psi(t)$ of a single variable such that the points $x=\phi(t)$, $y=\phi(t)$ occupy all positions inside a given square; thus a curve can cover a plane area. (For detailed discussion of such curves, consult E. H. Moore, 'On Certain Crinkly Curves,' trans., Am. Math. Soc., v. 1, pp. 72–90, 1900).

These examples show clearly that the most general idea of a curve is far removed from the comparatively simple idea first presented in analytical geometry. The definition at present accepted of a plane curve without multiple points, due to Jordan and Hurwitz, has been thus expressed in English (by Osgood): "A set of points which can be referred in a one-to-one manner and continuously to the points of a segment of a right line, inclusive of the extremities of the segment, if the curve is not closed, and to the points of the circumference of a circle if the curve is closed." (Hurwitz, 'Verhandlungen des ersten internationalen Mathematiker-Kongresses in Zürich,' 1897, pp. 102, 103).

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CURVES OF DOUBLE CURVATURE

(In French, *courbes gauches;* in German, *Curven doppelter Krummung*). A curve whose points do not all lie in a plane is variously called space curve, twisted curve, tortuous curve or curve of double curvature. The significance of the last-named designation becomes apparent in the description of the elements which enter the theory of the curve. There are two ways of regarding the curve: first, as given immediately and in all its extent by the intersection of two surfaces — a purely geometric conception; second, as arising kinematically through the continuous movement of a point. The first conception leads to the analytical formulation of a curve as the locus of points whose Cartesian co-ordinates satisfy two equations, the equations of the intersecting surfaces

(1) $f_1(x, y, z)=0, \quad f_2(x, y, z)=0.$

The second conception leads to the expression of the Cartesian co-ordinates x, y, z as functions of a variable magnitude u called the parameter:

(2) $x=\phi(u),\quad y=\chi(u),\quad z=\psi(u),$

a form of representation called the parametric representation of the curve. To the continuous succession of values of u corresponds the continuous succession of points of the curve.

It is known that not every curve in space is the complete intersection of two surfaces, and therefore (1) and (2) are not always equivalent forms. In fact, when the three equations (2), defining a curve, are transformed to the two equations (1), the latter often furnish curve branches in addition to the original curve. The parametric representation is, in many important respects, preferable to the first form, and such equations and formulas as are hereafter used will have reference to this form.

The subject matter may be conveniently divided into four parts: first, the determining elements of an infinitely small portion of the curve in the neighborhood of any point P of the curve; second, the character of the curve as a whole and the associated curves and surfaces; third, special curves and their derivation from given properties; fourth, classification, miscellaneous matters and the literature of the subject.

1. The Elements of the Curve at a Point. — The consideration of two points, of three points and of four points of the curve conducts immediately to fundamental elements.

The *tangent* at P is the limiting position assumed by the right line through P and a neighboring point P_1 of the curve as P_1 moves along the curve toward coincidence with P. It is convenient to say that the tangent at P is the right line through P and P_1, P_1 being infinitely near or consecutive to P, but it must be remembered that this and similar expressions which will be used further on are only abbreviations and figures of speech.

The single infinity of lines through P perpendicular to the tangent are *normals* to the curve and define the *normal plane* of the curve at P. Every plane through the tangent is a tangent plane at P. A plane passing through P and two neighboring points of the curve assumes in general a limiting position at P as the two neighboring points move along the curve toward coincidence with P. This is the *plane of osculation* at P and may be described as the plane determined by three consecutive points P, P_1, P_2. It is the tangent plane at P which has the closest contact with the curve.

The plane through the tangent perpendicular to the plane of osculation is called the *plane of rectification* at P. The normal plane, the plane of osculation and the plane of rectification are mutually at right angles and constitute the principal planes of the curve at P. Their intersections are three lines through P: the *tangent*, which is the intersection of the plane of osculation and the plane of rectification; the *principal normal*, which is the intersection of the normal plane and the plane of osculation; the *binormal*, the intersection of the normal plane and the plane of rectification. The three lines form a configuration called the *principal triedral* at P.

Of importance in the theory is the *circle of curvature*, namely, the limit circle defined by the fixed point P and two variable points P_1, P_2 as the variable points move along the curve toward coincidence with P. It is referred to as the circle through three consecutive points P, P_1, P_2 and obviously lies in the plane of osculation at P. Its centre, radius and the reciprocal of the radius are called respectively the *centre of curvature*, the *radius of curvature* and the *curvature of the curve* at P. Relative to the name, curve of double curvature, the curvature here described is properly first curvature, but it is customary to omit the word "first". The second curvature, to be noted shortly, is usually referred to as *torsion*.

Four points not in a plane determine one sphere. Through P and three variable points of the curve a sphere may be passed, which, when the variable points come into coincidence with P, becomes the *sphere of osculation* at P. It will be subsequently seen that its centre and the centre of first curvature are on a line parallel to the binormal at P.

The further development of the theory will employ the methods of the differential geometry in preference to limit processes. The elements already defined, when taken in pairs, give rise to new elements. The normal planes at the consecutive points P and P_1 intersect in a line passing through the centre of curvature of P and parallel to the binormal of P. It is called the *axis of curvature* of the curve at P. The planes of rectification at P, P_1 intersect in the *line of rectification* at P. This line passes through P, makes an angle with the binormal of P and is perpendicular to the principal normals of P and P_1. The planes of osculation at P, P_1 intersect in the tangent of the curve. The principal normals at P and P_1 do not intersect, nor do the binormals of P and P_1. The consecutive tangents do intersect in a point of the curve.

The Two Curvatures, or Curvature and Torsion. — As a point moves on the curve, the tangent continually changes its direction, as does also the plane of osculation: the first marks the tendency of the curve to depart from a right line, and the second the tendency to depart from a plane. Measures of these tendencies at a point P are defined as follows: If PP_1 be an infinitely small arc of length ds, and $d\epsilon$ the infinitely small angle between the tangents at P and P_1; and $d\tau$ the infinitely small angle between the planes of osculation at P and P_1 or, what is the same thing, the angle between the binormals of P and P_1; then the ratio $\frac{d\epsilon}{ds}$ is called the *curvature of the curve at P*, and the ratio $\frac{d\tau}{ds}$ is called the *torsion of the curve at P*. The angles $d\epsilon$ and $d\tau$ are called respectively *angle of contingence*, and *angle of torsion* at P. This point of view of curvature leads at once to the circle of curvature previously described. The ratio $\frac{d\epsilon}{ds}$ has the same value for the curve and the circle at P, and if R designates the radius of the circle, there results *curvature at a point* $=\frac{1}{R}=\frac{d\epsilon}{ds}$. On the other hand, there is no circle of torsion connected with the curve, and it is only by analogy that the term *radius of* *torsion*, T, is defined to be the reciprocal of the torsion. Expressed in equational form, *torsion at a point* $= \frac{1}{T} = \frac{d\tau}{ds}$.

A third curvature is sometimes regarded, but merely as a convenience. It is the limiting ratio of the infinitely small angle $d\kappa$ between the principal normals at P and P_1 to the arc ds. It is in a sense the resultant of the other two curvatures, and has received the name of *entire curvature*. The angle $d\kappa$ is called the *angle of entire curvature*. Entire curvature is not an independent curvature, for, as will shortly be seen, its angle $d\kappa$ is a function of the other two through the equation $d\kappa^2 = d\epsilon^2 + d\tau^2$.

Before clothing the foregoing definitions in analytical garb, it is necessary to adopt conventions as to the signs of directions and to complete the notation. Of the two directions on a curve, that is taken as positive which corresponds to increasing values of u. The positive direction of the tangent is taken to coincide with the positive direction of the curve, and the direction cosines of the angles the positive tangent makes with the positive directions of the co-ordinate axes x, y, z are designated by α_1, β_1, γ_1, respectively. The positive direction of the principal normal is the direction from P toward the centre of curvature, and its direction cosines are designated by α_2, β_2, γ_2. The positive direction of the binormal is so taken that it is directed with respect to the positive tangent and positive principal normal as the positive z axis is directed to the positive x axis and positive y axis. Its direction cosines are represented by α_3, β_3, γ_3.

A table conveniently exhibits these relations:

	x	y	z
Tangent..............	α_1	β_1	γ_1
Principal normal.......	α_2	β_2	γ_2
Binormal..............	α_3	β_3	γ_3

In the elements of solid analytic geometry, it is shown that the determinant of the nine direction cosines equals 1, i.e. $\begin{vmatrix} \alpha_1 & \beta_1 & \gamma_1 \\ \alpha_2 & \beta_2 & \gamma_2 \\ \alpha_3 & \beta_3 & \gamma_3 \end{vmatrix} = 1$,

and that each constituent is equal to its cofactor. For example, $\alpha_2 = \gamma_1\beta_3 - \gamma_3\beta_1$. It is also a theorem of the elements of analytic geometry of space, that if a straight line varies its direction infinitely little, say by an angle dw, and if l, m, n are the direction cosines of the first position, and $l+dl$, $m+dm$, $n+dn$ are the direction cosines of the second position, that $dw^2 = dl^2 + dm^2 + dn^2$. It has immediate application in the two curvatures.

Taking over from the calculus the value of ds^2 and differentiating,

$$(3) \qquad \begin{aligned} ds^2 &= dx^2 + dy^2 + dz^2, \\ ds\, d^2s &= dx\, d^2x + dy\, d^2y + dz\, d^2z. \end{aligned}$$

The analytical side of the foregoing development is now easily formulated. All equations which follow and which contain the variables x, y, z and their differentials dx, dy, dz, d^2x, d^2y, d^2z, ds, d^2s may be expressed in terms of the parameter u and its differential du by means of equations (2), the equations resulting from their differentiation, and equations (3).

One has immediately from the definitions of the elements at the point $P(x, y, z;\, u)$

$$(4) \qquad \alpha_1 = \frac{dx}{ds},\ \beta_1 = \frac{dy}{ds},\ \gamma_1 = \frac{dz}{ds};$$

hence, for the equations of the tangent,

$$(5) \qquad \frac{\xi - x}{dx} = \frac{\eta - y}{dy} = \frac{\zeta - z}{dz},$$

and for the normal plane,

$$(6) \qquad (\xi - x)dx + (\eta - y)dy + (\zeta - z)dz = 0.$$

The symbols ξ, η, ζ represent here and subsequently the current co-ordinates of the points of line, plane, etc.

In determining the constants L, M, N, Q so that the plane $L\xi + M\eta + N\zeta + Q = 0$ passes through the point x, y, z, and the infinitely near points $x+dx$, $y+dy$, $z+dz$, and $x+2dx+d^2x$, $y+2dy+d^2y$, $z+2dz+d^2z$, one obtains

$$(\xi - x)(dy\, d^2z - dz\, d^2y) + (\eta - y)(dz\, d^2x - dx\, d^2z) + (\zeta - z)(dx\, d^2y - dy\, d^2x) = 0,$$

or, in putting for convenience

$$(7) \qquad A = dy\, d^2z - dz\, d^2y,\ B = dz\, d^2x - dx\, d^2z,\ C = dx\, d^2y - dy\, d^2x,$$

the equation of the plane of osculation in the form

$$(8) \qquad A(\xi - x) + B(\eta - y) + C(\zeta - z) = 0.$$

This at once gives

$$(9) \qquad \alpha_3 = \frac{A}{\sqrt{A^2+B^2+C^2}},\ \beta_3 = \frac{B}{\sqrt{A^2+B^2+C^2}},\ \gamma_3 = \frac{C}{\sqrt{A^2+B^2+C^2}};$$

and for the equations of the binormal

$$(10) \qquad \frac{\xi - x}{A} = \frac{\eta - y}{B} = \frac{\zeta - z}{C}.$$

From the determinant of the direction cosines one has

$$(11') \qquad \alpha_2 = \gamma_1\beta_3 - \gamma_3\beta_1,\ \beta_2 = \alpha_1\gamma_3 - \alpha_3\gamma_1,\ \gamma_2 = \beta_1\alpha_3 - \beta_3\alpha_1,$$

and hence, by virtue of (4) and (9),

$$(11) \qquad \alpha_2 = \frac{Bdz - Cdy}{ds\sqrt{A^2+B^2+C^2}},\ \beta_2 = \frac{Cdx - Adz}{ds\sqrt{A^2+B^2+C^2}},\ \gamma_2 = \frac{Ady - Bdx}{ds\sqrt{A^2+B^2+C^2}}.$$

The equation of the plane of rectification is

$$(12) \qquad (\xi - x)\alpha_2 + (\eta - y)\beta_2 + (\zeta - z)\gamma_2 = 0,$$

and the equations of the principal normal are

$$(13) \qquad \frac{\xi - x}{\alpha_2} = \frac{\eta - y}{\beta_2} = \frac{\zeta - z}{\gamma_2}.$$

Applying to curvature the theorem relative to the infinitely small change in direction of a right line, one has $d\epsilon^2 = d\alpha_1^2 + d\beta_1^2 + d\gamma_1^2$, whence, in differentiating (4) and employing (3) in the reduction,

$$(14) \qquad (\text{curvature})^2 = \frac{1}{R^2} = \frac{d\epsilon^2}{ds^2} = \frac{A^2+B^2+C^2}{ds^6},$$

and also

$$(15) \qquad d\alpha_1 = \frac{Bdz - Cdy}{ds^3},\ d\beta_1 = \frac{Cdx - Adz}{ds^3},\ d\gamma_1 = \frac{Ady - Bdx}{ds^3}.$$

A comparison of (11), (14) and (15) gives

$$(16)\qquad \alpha_2 = R\frac{d\alpha_1}{ds},\quad \beta_2 = R\frac{d\beta_1}{ds},\quad \gamma_2 = R\frac{d\gamma_1}{ds}.$$

When the arc s is the independent variable, that is, when $u = s$, equations (14) and (16) take simple forms,

$$\frac{1}{R^2} = \frac{d^2x}{ds^2} + \frac{d^2y}{ds^2} + \frac{d^2z}{ds^2};$$

$$\alpha_2 = R\frac{d^2x}{ds^2},\ \beta_2 = R\frac{d^2y}{ds^2},\ \gamma_2 = R\frac{d^2z}{ds^2}.$$

Applying the same process to torsion $d\tau^2 = d\alpha_3^2 + d\beta_3^2 + d\gamma_3^2$, and a differentiation of (9) gives

$$\begin{aligned} d\alpha_3 &= -\frac{Bdz - Cdy}{\sqrt{A^2+B^2+C^2}}\,\frac{Ad^3x + Bd^3y + Cd^3z}{A^2+B^2+C^2},\\ (17)\quad d\beta_3 &= -\frac{Cdx - Adz}{\sqrt{A^2+B^2+C^2}}\,\frac{Ad^3x + Bd^3y + Cd^3z}{A^2+B^2+C^2},\\ d\gamma_3 &= -\frac{Ady - Bdx}{\sqrt{A^2+B^2+C^2}}\,\frac{Ad^3x + Bd^3y + Cd^3z}{A^2+B^2+C^2}, \end{aligned}$$

whence

$$(18)\qquad \text{torsion} = \frac{1}{T} = \frac{d\tau}{ds} = -\frac{Ad^3x + Bd^3y + Cd^3z}{A^2+B^2+C^2},$$

The radical $\sqrt{A^2 + B^2 + C^2}$ is to be taken throughout with positive sign. The numerator in the value of torsion, written in the form of a determinant, is $\begin{vmatrix} dx & dy & dz \\ d^2x & d^2y & d^2z \\ d^3x & d^3y & d^3z \end{vmatrix}$, and its evanishment for all values of u is the necessary and sufficient condition that the space curve is in reality a plane curve. If it vanishes only for isolated values of u, the planes of osculation at the corresponding points are *stationary*, that is, the plane of osculation does not tend to change in passing to the consecutive point. Curvature, and therefore R are always taken positive. This, however, is not the case with torsion; its sign may be positive or negative and is determined without ambiguity in the foregoing equation. A space curve is said to have a right (left) twist at P if it appears to an observer, standing at P on the plane of osculation (either side) and looking in the direction of the centre of curvature, to rise from left (right) to right (left) through P. The above formula, with this definition of twist, associates right twist with positive torsion and left twist with negative torsion.

The Frenet Equations.—These are nine very important equations in which the quotients of the differentials of the direction cosines of the lines of the principal triedral divided by ds, are expressed in terms of the direction cosines and R and T. Six of these equations are already at hand: from (16)

$$(19)\qquad \frac{d\alpha_1}{ds} = \frac{\alpha_2}{R},\ \frac{d\beta_1}{ds} = \frac{\beta_2}{R},\ \frac{d\gamma_1}{ds} = \frac{\gamma_2}{R};$$

from (11), (17) and (18)

$$(20)\qquad \frac{d\alpha_3}{ds} = \frac{\alpha_2}{T},\ \frac{d\beta_3}{ds} = \frac{\beta_2}{T},\ \frac{d\gamma_3}{ds} = \frac{\gamma_2}{T};$$

from (11′) by differentiation, with substitutions from (19) and (20),

$$(21)\qquad \frac{d\alpha_2}{ds} = -\frac{\alpha_1}{R} - \frac{\alpha_3}{T};\ \frac{d\beta_2}{ds} = -\frac{\beta_1}{R} - \frac{\beta_3}{T},$$
$$\frac{d\gamma_2}{ds} = -\frac{\gamma_1}{R} - \frac{\gamma_3}{T}.$$

The equations were also given later by Serret and are sometimes called by his name. They are particularly used in the differentiation of equations, and are of importance in questions relating to the determination of curves with assigned properties.

2. The Curve and Its Associated Curves and Surfaces.— There are four ruled surfaces on which the space curve lies and a fifth ruled surface on which it does not lie, to all of which surfaces it sustains special relations. The tangents at all the points of the curve constitute the *tangential surface* of the curve. This surface consists of two sheets with the space curve as a sharp edge. A normal plane at P intersects the two sheets of the surface in a curve which has P as a cusp point. The space curve is the locus of intersections of consecutive tangents and is called the *edge of regression* of the tangential surface. The surface is a developable surface,[1] namely, one which could be supposed laid down in a plane without stretching. To the space curve there is an infinity of involutes all lying in the tangential surface. One may imagine a string stretched on the curve and so unwound that the part continually being freed from the curve remains tangent to the curve; each point of the string will describe an involute on the tangential surface to which the space curve is an evolute.

The locus of the binormals of the curve is called the *surface of the binormals*. It is a non-developable or skew surface.[1] The infinitely small arc element is perpendicular to the binormals at its extremities, whence it follows that the space curve is the *line of striction*[1] of its binormal surface.

The locus of the principal normals is a skew surface and is called the *surface of the principal normals*. The space curve is an orthogonal trajectory of the right lines of the surface and is also an asymptotic[1] line of the surface. This latter property follows from the fact that the planes of osculation of the curve are tangent planes to the surface at the points of the curve.

The locus of the lines of rectification is a developable surface and is called the *surface of rectification* of the curve. It owes its name to the circumstance that when it is developed in a plane, the space curve is transformed into a straight line. From this it follows that a space curve is a geodesic[1] on its surface of rectification. That the space curve passes into a straight line when the surface of rectification is developed in a plane is readily established from the Frenet equations (21). The angle between two consecutive planes of rectification, $d\kappa$, vanishes in the development of the surface, or $d\kappa^2 = d\alpha_1^2 + d\beta_1^2 + d\gamma_1^2 = 0$. Writing (21) in the form $d\alpha_2 = -\alpha_1 d\epsilon - \alpha_3 d\tau$, $d\beta_2 = \ldots$, $d\gamma_2 = \ldots$, squaring and adding, there results $d\epsilon^2 + d\tau^2 = 0$, or $d\epsilon = 0$, $d\tau = 0$. As the angle of contingence is zero, the consecutive tangents of the developed curve coincide, and the curve is a straight line.

The fifth ruled surface is the locus of the axes of curvature. It is a developable surface, not containing the curve, but containing the curve of centres of curvature and also the curve of centres of the osculating spheres. The surface bears the name of *polar surface*, or *evolute surface*. The axis of curvature is sometimes called polar axis and hence the name polar surface. To the space curve as an involute there is an infinity of evolute curves all lying on the polar surface, and hence the name evolute surface. If one imagined a string stretched freely on the polar surface with one extremity at P of the space curve, the part of the string on the surface would lie in one of the evolutes of the space curve. Further, if two strings were supposed joined at P, each lying on an evolute, and the two strings then unwound from the polar surface, the point P would describe the space curve, and the angle between the strings at P would remain constant in the motion. The polar surface is the common surface of rectification of all the evolutes, and these curves are, accordingly, geodesics of the surface.

The curve of centres of curvature is the intersection of the polar surface and the principal normal surface. Its equations are

$$(22)\qquad \xi = x + R\alpha_2,\ \eta = y + R\beta_2,\ \zeta = z + R\gamma_2.$$

Those of the axis of curvature are

$$\xi = x + R\alpha_2 + v\alpha_3,\ \eta = y + R\beta_2 + v\beta_3,$$
$$\zeta = z + R\gamma_2 + v\gamma_3,$$

for u constant and v variable. If u is regarded as variable as well as v, the equations define the polar surface. Two consecutive axes of curvature, say the axes of P and P_1, intersect in a point of the edge of regression of the surface, but the point as a point on the first axis is equidistant from P, P_1, P_2, and as lying on the second axis is equidistant from P_1, P_2, P_3, and is therefore equidistant from P, P_1, P_2, P_3, or is the centre of the osculating sphere at P. The edge of regression of the polar surface is the locus of the centres of the osculating spheres of the space curve. Analytically treated the problem gives for the equations of the locus of centres of the osculating spheres:

$$(23)\qquad \xi = x + R\alpha_2 - \frac{dR}{d\tau}\alpha_3,\ \eta = y + R\beta_2 - \frac{dR}{d\tau}\beta_3,$$
$$\zeta = z + R\gamma_2 - \frac{dR}{d\tau}\gamma_3,$$

and for the radius, r, of the sphere

$$(24)\qquad r^2 = R^2 + \left(\frac{dR}{d\tau}\right)^2.$$

There is a complete reciprocity between a space curve and the edge of regression of its polar surface when, and only when, the space curve is a curve of constant curvature, i.e., $R =$ constant. Equations (23) reduce to (22), showing that the curve on the polar surface becomes the locus of the centres of curvature of the space curve. Some of the relations between the two curves when $R =$ constant are here stated: Each is the locus of the centres of curvature of the other with the same constant curvature; the tangent of the one is the axis of curvature of the other; the corresponding plane of osculation of the one is the normal plane of the other; corresponding planes of rectification are parallel; angle of contingence of the one equals angle of torsion of the other. The last two properties hold also when R is not constant.

If a space curve is spherical, its polar surface will be a cone with vertex at the centre of the sphere, and the polar edge of regression reduces to a point, the centre of the sphere. ξ, η, ζ, are, accordingly, constants for all values of u, and their differentials are zero. The differentiation furnishes $R\,d\tau + d\left(\frac{dR}{d\tau}\right) = 0$ as the necessary and sufficient condition for a spherical curve.

Spherical Depiction.— Each point of the space curve is co-ordinated with a point on the surface of a unit sphere in a definite manner. Assume a sphere of radius one with centre at the origin of axes, and draw a radius to a point p of the surface parallel to the positive direction of the tangent at the point P of the curve. The point p is the spherical image or picture of P with respect to the tangent, and the picture of all the points of the space curve is a curve called the *spherical indicatrix of the space curve with respect to the tangent.* Similarly, there are spherical images with respect to the principal normal, binormal, etc. Such depictions lead to problems concerning the determination of curves with given spherical images.

Intrinsic Equations.—A space curve is completely determined as to its form, though not as to its position in space, when curvature and torsion are given in terms of the arc s of the curve. Two equations of this character are called the intrinsic equations of the curve. To pass from the intrinsic equations $R = f(s)$, $T = g(s)$ to the parameter representation requires the integration of a differential equation of the Riccati form. A discussion of the problem is given in Darboux, Vol. I, and in Scheffer, Vol. I (see paragraph on literature of subject). Curvature and torsion do not change in value when the curve is moved about in space, nor do the successive derivatives of curvature and torsion with respect to s change in value. These quantities and all functions of them are called differential invariants with respect to all movements of the curve in space.

3. *Special Curves.*—The curve of constant curvature, $\frac{1}{R} =$ constant, has already been spoken of. It is obvious that in the development of the tangential surface in a plane, the curve transforms into a circle. Any curve of this class of radius of curvature R is given by the equations

$$x = R\int \lambda\, d\theta,\ y = R\int \mu\, d\theta,\ z = R\int \nu\, d\theta,$$

in which λ, μ, ν are any three functions of θ that satisfy the two equations,

$$(25)\qquad \lambda^2 + \mu^2 + \nu^2 = 1,\ \left(\frac{d\lambda}{d\theta}\right)^2 + \left(\frac{d\mu}{d\theta}\right)^2 + \left(\frac{d\nu}{d\theta}\right)^2 = 1.$$

Direct differentiation of the equations of the curve will show that $\lambda = \alpha_1$, $\mu = \beta_1$, $\nu = \gamma_1$, and $d\theta = d\varepsilon$.

The curve of constant torsion $\frac{1}{T} =$ constant is defined by the equations

$$x = T\int\left(\mu\frac{d\nu}{d\theta} - \nu\frac{d\mu}{d\theta}\right)d\theta,\ y = T\int\left(\nu\frac{d\lambda}{d\theta} - \lambda\frac{d\nu}{d\theta}\right)d\theta,$$
$$z = T\int\left(\lambda\frac{d\mu}{d\theta} - \mu\frac{d\lambda}{d\theta}\right)d\theta,$$

where λ, μ, ν are functions of θ satisfying the conditions (25). Again, direct differentiation of the equations shows $\lambda = \alpha_3$, $\mu = \beta_3$, $\nu = \gamma_3$, and $d\theta = d\tau$. Examples of curves of constant torsion are furnished by the asymptotic curves of surfaces of constant negative (Gauss) curvature.[1] This theorem was established by Enneper, *Göttinger Nachrichten*, 1870.

The curves in which the ratio of curvature and torsion is constant, $\frac{T}{R}=$constant, are helices, namely, curves on cylindrical surfaces that intersect all the right-line generators of the surface under a constant angle. Such a curve is a general helix. When, however, both curvature and torsion are constant, the curve becomes the ordinary helix, i. e., the helix on a right circular cylinder. A helix passes into a straight line when the cylindrical surface is developed in a plane. The cylindrical surface is its surface of rectification, and the right-line generators are the lines of rectification. The helix is, accordingly, a geodesic of the cylindrical surface, and this property itself could be taken as the definition of a helix. The principal normals are all parallel to a plane perpendicular to the generators of the cylindrical surface. The original sources on the subject of the helix are Puiseux, *Journ. de Math.* (Vol. VII, 1842); Bertrand, *Journ. de Math.* (Vol. XIII, 1848).

Bertrand found that if a curve is of such a character that there exists between its curvature and torsion a linear relation with constant coefficients, $\frac{a}{R}+\frac{b}{T}=1$, there is one, and only one, other curve which has the same principal normals as the first. The length on a principal normal between corresponding points of the curves is constant. The associated curves are called Bertrand curves. The theorem suffers exception when the curvature and torsion are both constant, namely, in the case of the ordinary helix. Here there is an infinity of Bertrand curves, all helices on the common principal normal surface. Bertrand, *Journ. de Math.* (Vol. XV, 1850); J. A. Serret, *Journ. de Math.* (Vol. XVI, 1851).

The ordinary helix holds, relative to space curves, a position somewhat similar to that held by a circle relative to plane curves. The circle is the curve of constant curvature (torsion $=0$), and the ordinary helix is the curve of constant curvature and constant torsion. At a point of a plane curve, one circle may be passed having contact of the second order with the curve, or, as one may say, the circle and curve have three consecutive points in common, and, in general, no more than three points. It is the circle of osculation of the curve. Through three consecutive points, P, P_1, P_2 of a space curve a single infinity of ordinary helices may be passed, but in general they will not have more than the three points in common with the curve. All elements that depend on three consecutive points are common elements of the curves, viz., tangent, plane of osculation, principal normal, circle of curvature, at P. Among the helices is one whose principal normal at P_1 coincides with the principal normal of the space curve at the same point. This helix has the same torsion and curvature as the space curve at P, and is called the osculating helix of the space curve at the point P.

The length of a finite portion of a curve defined by equations (2) rests upon the evaluation of a definite integral. If on the arc lying between M and P points are marked in succession proceeding from M toward P, viz., M, Q_1, Q_2, ... Q_{n-1}, P, and the chords MQ_1, Q_1Q_2, ... $Q_{n-1}P$ are drawn, there will be formed an inscribed polygon, the length of which will vary with the number of inscribed points and their position. But if the number of sides of the polygon be indefinitely increased, and each side be indefinitely diminished, the length of the polygon will approach a definite limiting value. This definite limiting value is defined to be the arc length from M to P. If M corresponds to the parameter value $u=u_0$, and P to the general value u, the arc length s is the definite integral

$$s=\int_{u_0}^{u}\sqrt{\left(\frac{dx}{du}\right)^2+\left(\frac{dy}{du}\right)^2+\left(\frac{dz}{du}\right)^2}\,du.$$

Whence by differentiation the linear element of arc is

$$ds^2=\left[\left(\frac{du}{dx}\right)^2+\left(\frac{dy}{du}\right)^2+\left(\frac{dz}{du}\right)^2\right]du^2=dx^2+dy^2+dz^2$$

The foregoing theory of the space curve contains implicitly the assumption that the arc element ds is not zero; an assumption which holds for all real curves. In dropping the condition that ds may not be zero, one is led to certain imaginary curves defined by the differential equation

$$\left(\frac{dx}{du}\right)^2+\left(\frac{dy}{du}\right)^2+\left(\frac{dz}{du}\right)^2=0.$$

These curves are called minimal curves and are either minimal right lines or minimal twisted curves with tangents that are minimal right lines. The right lines

$$x=a_1+b_1u,\quad y=a_2+b_2u,\quad z=a_3+b_3u$$

satisfy the above differential equation when $b_1^2+b_2^2+b_3^2=0$.

The values of the constants b_1, b_2, b_3, taken subject to this condition, furnish a single infinity of minimal right lines lying on an imaginary cone with vertices at the points (a_1, a_2, a_3). The intersection of the cone by the plane of infinity is the imaginary circle at infinity. The minimal lines through any point of space are the lines joining the point to the points of the imaginary circle at infinity. The twisted minimal curves are all represented by the equations

$$x=\tfrac{1}{2}(1-u^2)f''(u)+uf'(u)-f(u),$$

$$y=\frac{i}{2}(1+u^2)f''(u)-iuf'(u)+if(u),$$

$$z=uf''(u)-f'(u).$$

The accents indicate differentiation with respect to u; $i=\sqrt{-1}$; and $f(u)$ is a function of the complex imaginary variable u. $f(u)$ is restricted only in that its third derivative must not be zero. Elements of the curve which do not essentially rest on ds can be obtained in the usual way, viz., tangent, plane of osculation, etc. As the plane of osculation contains two consecutive tangents, it touches the imaginary circle at infinity. The tangential surface of the minimal curve accordingly circumscribes the circle at infinity. Inversely, a minimal curve can be defined as the edge of regression of a developable surface circumscribing the imaginary circle at infinity. The introduction of the minimal right lines and the imaginary circle at infinity enables one to express certain metric relations in projective form. The minimal curves find very elegant application in the theory of minimal surfaces (real). See SURFACES, THEORY OF.

The point P, to which all the developments have been attached, is supposed to be an ordinary point of the curve. A point is ordinary when this point and points on the curve in its immediate vicinity can be represented by the same three equations of form (2), each point corresponding to a single value of u. The three functions $\phi(u)$, $\chi(u)$, $\psi(u)$ must be developable in power series at the point, and the three first derivatives must not be simultaneously zero. As an example of a singularity it is obvious that these conditions are not satisfied by a point at which the curve intersects itself. The singularities of a twisted curve are discussed in Cayley, 'Collected Works' Vol. I, 8; Fine, *Amer. Jour. of Math.*, 8; *Staude, Amer. Jour. Math.*, 17.

4. **Classification and Literature.**— Curves are divided into algebraic and transcendental curves, according as their equations are or are not algebraic. The *order* of a space curve is the number of points of intersection (real or imaginary) of the space curve by an arbitrary plane. The *rank* of the curve is the number of tangents intersected by an arbitrary straight line, i.e., it is the order of the tangential surface of the curve. The *class* of the curve is the number of planes of osculation that pass through an arbitrary point of space. At present there is no known system of elements which suffice to characterize the general space curve. There is no proper curve of the second order; there is one family of curves of the third order; there are *two* families of curves of the fourth order, a fact which puts in evidence that the order of a curve does not in itself suffice to characterize space curves. When to order is added the number of apparent double points, viz., the number of chords which can be drawn through an arbitrary point of space, a differentiation is effected, but this again fails in the case of curves of the ninth order. Cayley established formulas for the space curve corresponding to the Plücker formulas for plane curves. Consult Cayley, 'Collected Mathematical Papers,' Vol. I, p. 207.

The first systematic treatment of space curves was given by Clairaut in 1751, 'Traité de courbes à double courbure.' Among the older sources not hitherto mentioned are Lancret, 'Mémoires présentés . . . à l'Académie des sciences' (1806); de Saint-Venant, 'Journal de l'École Polytechnique.' The more important treatises and texts that give more or less complete representations of the theory are Bianchi, 'Lezioni di geom. diff. (Pisa, 1885–86, translated into German by Lukat, Leipzig 1889); Darboux, 'Leçons sur la théorie générale des surfaces' (Paris 1887–96); Hoppe, 'Lehrbuch d. anal. Geom.' (Leipzig 1880); Joachimsthal, 'Anwendung der Differential- und Integralrechnung auf die allgemeine Theorie der Flächen und der Linien doppelter Krümmung' (Leipzig 1890); Laurent, 'Traité d' analyse,' 2, 7 (Paris); Salmon, 'Geometry of Three Dimensions'; Salmon-Fiedler, 'Anal. Geom. des Raumes' (Leipzig 1880); Scheffers, 'Anwendung der Differential und Integralrechnung auf die Geometrie' (Leipzig 1902); Schell, 'Allgemeine Theorie der Curven doppelter Krümmung in rein geometrischer Darstellung' (Leipzig 1898).

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CURWEN, kėr'wĕn, **John**, English musical educator: b. Heckmondwike, Yorkshire, 14 Nov. 1816; d. Heaton Mersey, Lancashire, 26 May 1880. He became a minister of the Independent body, being in 1844 elected pastor at Plaistow, Essex. Here he developed and promoted the Tonic Sol-fa method, and brought the system still more before public attention by the publication of his 'Grammar of Vocal Music' and 'Lessons in Music' in 'Cassell's Popular Educator.' In 1853 he established the Tonic Sol-fa Association, and in 1862 the Tonic Sol-fa College. He published, among other works connected with the system, the 'Child's Own Hymn-Book'; 'New Standard Course on the Tonic Sol-fa Method'; 'How to Observe Harmony.'

CURWEN, John Spencer, English musical writer: b. Plaistow, Essex, 30 Sept. 1847. He is a son of John Curwen (q.v.), and has been editor of the *Musical Herald* from 1866. He was educated at the Royal Academy of Music, becoming president of the Tonic Sol-fa College in 1880, and has traveled much in Europe and America investigating the subject of music in schools. He has published 'Studies in Worship Music'; 'Memorials of John Curwen'; 'The Boy's Voice'; 'School Music Abroad'; 'Music at the Queen's Accession.'

CURWOOD, James Oliver, American author: b. Owosso, Mich., 12 June 1878. On his father's side he is a descendant of Captain Marryat, the novelist. He studied at the University of Michigan; entered the journalistic field as assistant editor of the *News-Tribune* of Detroit, later becoming editor. In 1907 he resigned in order to devote himself exclusively to literary work. He is one of the foremost authorities on matters pertaining to the Northland of Canada. Each year he spends several months in the north, traveling far from civilization. He is the only American ever employed by the Dominion Government as a writer on exploration. His published works include 'The Courage of Captain Plum' (1908); 'The Wolf Hunters' (1908); 'The Great Lakes' (1909); 'The Gold Hunters' (1909); 'The Danger Trail' (1910); 'The Honor of the Big Snows' (1911); 'Philip Steele, of the Royal Mounted' (1911); 'The Valley of Silent Men' (1911); 'Flower of the North' (1912); 'Isobel' (1913); 'Kazan' (1914); 'God's Country and the Woman' (1915); 'The Hunted Woman' (1916); 'The Grizzly King' (1917); 'Baree, Son of Kazan' (1917); 'The Courage of Marge O'Doone' (1918).

CURZOLA, koor-dzō'lā, Austria, the most beautiful of the Dalmatian islands, in the Adriatic, stretching west to east about 25 miles, with an average breadth of four miles, lat. 43° N. and long. 17° E., area, 107 square miles. It is covered in many places with magnificent timber. The fisheries are very productive. It produces grain, wine and olives. The inhabitants are engaged chiefly in boatbuilding, seafaring and fishing. There are several good harbors. Pop. 29,908. The principal towns are Curzola, of 2,157 inhabitants, and Blatta with 6,837 inhabitants. The island came under Austrian rule in 1815.

CURZON, George Nathaniel (EARL CURZON OF KEDLESTON), English statesman and administrator: b. Kedleston, 11 Jan. 1859. He was educated at Eton and Balliol College, Oxford;

became assistant private secretary to the Marquis of Salisbury in 1885 and next year was elected member of Parliament for the Southport division of Lancashire, which he represented till 1898. He was under-secretary for India in 1892 and in 1895 became under-secretary of state for foreign affairs. In 1899 he was appointed viceroy of India, and at the same time created a peer (in the Irish peerage) by the style of Baron Curzon of Kedleston. His object in accepting an Irish peerage was that he might be eligible to sit in the House of Commons during the lifetime of his father, Baron Scarsdale. His reign as viceroy of India was characterized by great vigor and he carried some important reforms; but the partition of Bengal aroused considerable hostility among the natives. He was brought into conflict with Lord Kitchener, then commander-in-chief in India, on a question affecting the civil control of military affairs, and as his views were not supported by the home government, he resigned 20 Aug. 1905. He was one of the leaders of the House of Lords in defending that House against the attacks of the Liberal party, but assisted materially in reconciling the majority of the peers to accepting the provisions of the Parliament Act (1912). In June 1915 he joined the Asquith coalition ministry as Lord Privy Seal. He holds a distinguished place as a geographer and author; was elected chancellor of Oxford University in 1907; was president of the Royal Geographical Society, 1911–14; and was created Earl Curzon in 1911. He married Mary Victoria, daughter of L. Z. Leiter, Chicago, in 1895, who died in 1906. He is the author of 'Russia in Central Asia' (1889); 'Persia and the Persian Question' (1892); 'Problems of the Far East' (1894); 'Lord Curzon in India' (1906); 'Principles and Methods of University Reform' (1909); 'Modern Parliamentary Eloquence' (1913); 'War Poems and Other Translations' (1915); 'Subjects of the Day' (1915).

CUSA, koo'sä, or **CUSANUS, Nikolaus** (originally **NIKOLAS CHRYPFFS**, or **KREBS**), German ecclesiastic: b. Kues, near Treves, 1401; d. Todi, Italy, 11 Aug. 1464. He was educated at Deventer by the Brethren of the Common Life and at the University of Padua. As archdeacon of Liége he took the anti-papal side at the Council of Basel; but ultimately altered his views and became bishop of Brixen in Tyrol, cardinal and papal legate to Constantinople. He exposed the false Isidorian decretals, denounced perverted scholasticism inn 'De Docta Ignorantia', taught that the earth went round the sun and the plurality of worlds, and in his pantheistic tendencies was a precursor of Giordano Bruno. His most important works have been translated into German by F. A. Scharpff (Freiburg 1862) who also published the first part of a biography (Mainz 1842) and subsequently 'Der Kardinal und Bischof Nikolaus von Cusa' (Tübingen 1871). Consult also Falkenburg, 'Grundzüge der Philosophie des Nikolaus von Cusa' (Breslau 1890); Schanz, 'Cardinal Nikolaus von Cusa als Mathematiker' (Rothweil 1872); Höffding, 'History of Modern Philosophy' (Vol. I, New York 1900).

CUSACK, Mary Frances, Irish writer; better known as the NUN OF KENMARE: b. Dublin, 6 May 1820; d. 7 June 1899. Originally a Protestant, she became a Roman Catholic and joined the Poor Clares, one of the sisterhoods of Saint Francis, and for 23 years conducted a convent of the order at Kenmare. When in 1884 she established the Sisters of Peace, an order similar to the Poor Clares but with a wider range, not only did Leo XIII sanction the work, but she received the hearty support of Christians, both Catholic and Protestant. She visited the United States in 1886. Among her many published books are 'Student's History of Ireland'; 'Woman's Work in Modern Society'; 'The Pilgrim's Way to Heaven'; 'Jesus and Jerusalem'; lives of Saint Patrick, Daniel O'Connell, etc. Consult 'The Nun of Kenmare: An Autobiography' (1888).

CUSACK, Thomas F., American Roman Catholic bishop: b. New York, 22 Feb. 1862; d. Albany, N. Y., 12 July 1918. His early years were spent in the East Side of New York and it was in that section that he spent most of his priestly career. He attended the public schools, and then attended the College of Saint Francis Xavier, where he received his preliminary training. He received his theological course at Saint Joseph's Seminary, Troy, N. Y. On 30 May 1885 he was ordained to the priesthood by the late Bishop McNierney of Albany. His first assignment was to Saint Teresa's, Rutgers street, New York. After five years as assistant there he was promoted to the pastorate of Saint Peter's, Rosendale. In 1897 he resigned his pastorate to organize the New York Apostolate. On becoming superior of that band of missionary priests he was again designated assistant at Saint Teresa's. On 9 March 1904 he was appointed auxiliary bishop of New York and on 25 April of the same year he was consecrated titular bishop of Themiscyra by Cardinal Farley. At the same time he was appointed irremovable rector of Saint Stephen's, New York. Here he remained until his appointment to the see of Albany, which was made 5 July 1915. One of his first acts as Bishop of Albany was to organize a band of missionaries to preach the faith in the outlying regions of the diocese where the Catholic Church was seldom heard of. He was the leading spirit in the organizing of the Catholic State Charities Society. During the Spanish-American War he was auxiliary chaplain at Chickamauga, where he worked night and day among the sick and was highly commended by the officers in charge. After the entry of America in the World War he placed the resources of his diocese at the disposal of the government, these included several hospitals, homes and a large country inn with 70 acres of land suitable for a convalescent hospital.

CUSCATLÁN, koos-kat-län', Salvador, a department bounded on the north by the departments of Chalatenango and Cabañas, on the east by the same departments and San Vicente; on the south by San Vicente and La Paz, and on the west by the department of San Salvador. The greater part of its surface is covered by lofty mountain ranges separated by narrow valleys; toward the north and northeast, however, near the Cuezalapa and Lempa rivers, there are comparatively level districts. The department was formed in 1835, and was originally much more extensive than it is at present (that is, 1,078 square miles), including until 1855 all of the Chalatenango region, and until 1875 a portion of what is now Cabañas. It is an agricultural country, the chief products being coffee, sugar, indigo, rice, tobacco, starch, cheese and cereals. Twice each year the people gather from all parts, in Cojutepeque at the Feast of Saint John, 29 August, and at Suchitoto, 8 December, to exchange native products for foreign merchandise. The capital, Cojutepeque (pop. about 8,000), is situated near the summit of an extinct volcano, 2,614 feet above sea-level. Its streets are narrow and crooked, but the suburbs are beautiful. It has a town-hall, hospital, public school, four churches, public baths, etc. There are 17 towns in the department, the more important being Suchitoto, San Pedro, Perulapán, Tenancingo, San Rafael and Guayabal. Pop. 72,000.

CUSCO-BARK, koozˈkō, or **CUZCO-BARK,** the bark of *Cinchona pubescens,* which comes from Cuzco, in South America, and is exported from Arequipa. It contains a peculiar alkaloid which resembles cinchonine in its physical qualities, but differs from it in its chemical properties.

CUSCUS, kŭsˈkŭs, a marsupial native to the islands of the Australian group and New Guinea. It is generally about the size of a house cat; has a small head, large eyes and a dense coat of fur, often pure white irregularly flecked with black, though this is variable. There are several distinct species. The food of all seems to be generally leaves and fruit, together with birds and other small animals. They frequent only forests of large trees, often swinging themselves from bough to bough by their long prehensile tails. They belong to the family of the phalangers (q.v.); and the genus *Cuscus* or *Phalanger,* as it is also known, embraces a number of species, differing in habitat and color. The best-known species perhaps is *Cuscus orientalis.*

CUSCUTACEÆ. See DODDER.

CUSH, kŭsh, in the Old Testament, the eldest son of Ham, also a country frequently mentioned. Cush, as a country, appears, to be African in most passages, and it is generally believed that the country intended can be no other than the region in Africa, south of Egypt, in ancient times designated more or less loosely as Ethiopia, and corresponding to the modern Nubia and northern Abyssinia. That it adjoined Egypt is shown by the passage in Ezekiel which states that the desolation of Egypt is to extend «from the tower of Syene unto the border of Cush.» In a number of passages, also, Cush, or its inhabitants, is mentioned in connection with Egypt. Cushites, for example, came out of Egypt with Shishak against Jerusalem. In other places again it is evident that the name Cush must be understood as referring to some part of Arabia. That several localities should be called by the same name may be explained by the frequent migrations of the early nations, who would give their own name to the countries into which they successively arrived. Some critics believe that in Gen. x, Cush, the brother of Mizraim, and Cush, the father of the Babylonian Nimrod, are two different persons, and that the name for the second Cush represents Kashshu, an old name for Babylonia.

CUSHEW-BIRD, kŭshˈō, another name for the galeate curassow. See CURASSOW.

CUSHING, Caleb, American jurist and diplomatist: b. Salisbury, Mass., 17 Jan. 1800; d. Newburyport, Mass., 2 Jan. 1879. His intellectual abilities manifested themselves early. He entered Harvard College at 13 and was graduated in 1817. He then studied law, was admitted to the bar at 22 and soon acquired an extensive practice, standing with Rufus Choate (q.v.) at the head of the Essex bar. He was a member of Congress 1835–43, and in the last-named year, having left the Whig party, was appointed by President Tyler first United States commissioner to China. He filled the post brilliantly, making a treaty so full and clear as to detail that it was the leading authority in settling disputes until 1860, when foreigners were allowed to enter Peking. He was an enthusiastic supporter of the Mexican War, raising a regiment and accompanying it to Mexico, for which he was promoted to the rank of brigadier-general. He was Attorney-General of the United States 1853–57, and was president of the Democratic convention in Charleston, S. C., in April 1860. During the Civil War period he was several times employed on confidential missions by President Lincoln and the heads of departments, and in 1868 was sent to Bogotá to settle a diplomatic difficulty, which he did successfully. In 1866 he was member of a commission to revise and codify the laws of Congress; he was appointed counsel before the Geneva Arbitration Tribune 1871–72; and was Minister to Spain 1874–77. His legal decisions were distinguished both for sagacity and professional erudition. He filled a large place in the political history of his time. He published ‘Practical Principles of Political Economy’ (1826); ‘History of Newburyport’ (1826); ‘Historical and Political Review of the Late Revolution in France’ (1833); ‘Reminiscences of Spain’ (1833); ‘Growth and Territorial Progress of the United States’ (1839); ‘Life of William Henry Harrison’ (1840); ‘The Treaty of Washington’ (1873).

CUSHING, Frank Hamilton, American ethnologist: b. Northeast, Pa., 22 July 1857; d. Washington, D. C., 10 April 1900. He became interested in Indian relics, and when 19 years old was made curator of the ethnological exhibit at the Centennial Exposition in Philadelphia. Accompanying Powell's New Mexico expedition, he settled among the Zuñi Indians for the purpose of study. In 1881 he conducted excavations in Arizona, and in 1895 discovered archæological remains in Florida. He conducted the Pepper-Hearst expedition to the Gulf coast of Florida in 1896 and published ‘Report on the Ancient Key Dwellers of Florida.’ In 1897 he became connected with the United States Bureau of Ethnology. Among his works are ‘The Nation of the Willows’ (1882); ‘My Adventures in Zuñi’ (1883); ‘Manual Concepts’ (1892); ‘Zuñi Folk Tales’ (1902); ‘Studies of Ancient Pueblo Keramic Art, as Illustrative of Zuñi Culture Growth’ (1884); ‘Zuñi Breadstuff’ (1885).

CUSHING, Harry Alonzo, American educator; b. Lynn, Mass., 15 Sept. 1870. He was graduated at Amherst College 1891, and took graduate studies at Columbia University 1894-

96. He was admitted to the bar in 1901, and has since practised in New York. He was lecturer in history and constitutional law at Columbia 1903–07 and from 4 Feb. 1907 to 1909 professor of law. He has published 'History of the Transition from Provincial to Commonwealth Government in Massachusetts' (1896); 'Voting Trusts, a Chapter in Recent Corporate History' (1915).

CUSHING, Harvey (Williams), American surgeon: b. Cleveland, Ohio, 8 April 1869. He was educated at Yale and Harvard universities, and in 1895 took up the practice of surgery. From 1902 to 1911 he was associate professor of surgery at Johns Hopkins University and in the latter year he became professor of surgery at Harvard. With Dr. George W. Crile he made an important contribution to the study of blood pressure in surgery. In 1913 he received an honorary fellowship from the Royal College of Surgeons. He is author of 'Dr. Garth, the Kit-kat Poet, 1661–1718' (1906) and 'The Pituitary Body and its Disorders' (1912).

CUSHING, Luther Stearns, American lawyer: b. Lunenburg, Mass., 22 June 1803; d. Boston, 22 June 1856. He was the only graduate of the Harvard Law School in 1826. He was clerk of the Massachusetts house of representatives 1832–44, and reported the decisions of the State Supreme Court 1850–56, preparing 12 volumes of law reports for those years. He was lecturer on Roman law at the Harvard Law School 1848–56, but is best known for his 'Manual of Parliamentary Practice' (1844), which immediately became an authority in parliamentary assemblies throughout the English-speaking world, and remained so for half a century. Other of his works are 'Treatise on Trustee Process' (1837); 'Treatise on Remedial Law' (1837); 'Reports of Controverted Election Cases in Massachusetts' (1852); 'Introduction Cases in Massachusetts' (1852); 'Introduction to the Study of Roman Civil Law' (1854); 'Lex Parliamentaria Americana' (1856), and translations of several legal works from the French and German.

CUSHING, Thomas, American statesman: b. Boston, Mass., 24 March 1725; d. there, 28 Feb. 1788. He was graduated from Harvard 1744; was elected speaker of the Massachusetts assembly 1766–74, and was a member of the First and Second Continental Congresses 1774–75, being defeated for re-election because he opposed a declaration of independence. In England, he was accused of being the leader of the American Revolution and Dr. Johnson accused him of aiming at an American crown. In 1783 he was lieutenant-governor of Massachusetts, and a member of the convention which ratified the Federal Constitution 1788. John Adams describes him as being exceedingly useful to the patriot leaders in obtaining valuable secret information.

CUSHING, William, American jurist: b. Scituate, Mass., 1 March 1732; d. there, 13 Sept. 1810. He was graduated at Harvard in 1751, became judge of probate in Maine in 1768, judge of the Massachusetts Superior Court in 1772 and chief justice in 1777. Washington appointed him associate justice of the Supreme Court of the United States in 1789, and in 1796 offered him the post of chief justice, which he declined. He was one of the founders of the American Academy of Arts and Sciences in 1780.

CUSHING, William Barker, American naval officer: d. Delafield, Wis., 4 Nov. 1842; d. Washington, D. C., 17 Dec. 1874. He entered the navy as a volunteer officer in 1861, and was promoted to a lieutenancy in the following year. His greatest exploit was performed in October 1864. For some time previous nothing had been able to cope with the Confederate ram *Albemarle*. She had successfully encountered a strong fleet of Federal gunboats and fought for several hours without sustaining material damage. Cushing volunteered to destroy the ram, and on the night of 27 October accomplished the feat. For this he received the thanks of Congress, and was made a lieutenant-commander, becoming a commander in 1872. See PLYMOUTH, N. C., ENGAGEMENT AT.

CUSHING, William Henry, Canadian statesman: b. Kenilworth, Ontario, 1852. He was educated in the public schools; after working on a farm for some years he went west to Calgary in 1883 and engaged in business, later becoming the head of an important manufacturing concern and the owner of extensive timber limits in British Columbia and elsewhere. In 1905 he was elected Liberal member for Calgary in the Alberta legislature; and in the same year, when the government of Alberta was organized with Alexander C. Rutherford as Premier, Cushing became Minister of Public Works, retaining that position until 1910. He was the first Canadian to make ownership of telephones a part of government policy.

CUSHMAN, Allerton Seward, American chemist: b. Rome, Italy, 2 June 1867. He was educated at the Worcester Polytechnic Institute, at Freiberg and at Heidelberg, Harvard and Johns Hopkins universities. He was associate professor of chemistry at Bryn Mawr College in 1900–01, associate director of the Office of Public Roads, United States Department of Agriculture, for eight years, and then in 1910 founded and became director of the Institute of Industrial Research. He is author of 'The Corrosion and Preservation of Iron and Steel' (1910) and of the following bulletins: 'The Useful Properties of Clay' (1904); 'The Decompositions of the Feldspars' (1907); 'The Use of Feldspathic Rocks as Fertilizers' (1907); and also a bulletin of the Institute of Industrial Research, 'The Preservation of the Exterior of Wooden Buildings' (1911).

CUSHMAN, Charlotte Saunders, American actress: b. Boston, 23 July 1816; d. there, 18 Feb. 1876. She appeared first in opera in 1834, and as Lady Macbeth in 1835. Miss Cushman played sometimes in high comedy, but her name is identified with tragic parts. In 1844 she accompanied Macready on a tour through the northern States and afterward appeared in London, where she was well received in a range of characters that included Lady Macbeth, Rosalind, Meg Merrilies and Romeo — her sister Susan (1822–59) playing Juliet. In later years she acted with great success in many cities in the United States and was also prominent as a dramatic reader. In 1856 she went to Rome, where she lived for many years. At her last appearance on the stage in 1874, she was presented with a laurel wreath by a body of eminent citizens with William Cullen Bryant as spokesman. Consult Stebbins, 'Charlotte Cushman: Her Letters and Memories of her Life' (Boston 1878); Clement, 'Charlotte Cushman' (ib. 1880); Cook, 'Hours with the Players' (London 1881); Price, W. T., 'A Life of Charlotte Cushman' (New York 1894); Clapp, H. A., 'Reminiscences of a Dramatic Critic' (Boston 1902). She retired from the stage in 1875.

CUSHMAN, Robert, American colonist: b. Kent County, England, about 1580; d. England 1625. He was one of the Pilgrims who accompanied John Carver to Leyden in Holland. In 1617 he and Carver went to London and endeavored to secure a charter to settle in America and enjoy the privilege of absolute freedom of worship which the king finally in 1619 granted. In 1620 Carver and Cushman made arrangements for vessels to transport the Pilgrim colony at Leyden to America. Cushman remained in England as the colonists' financial agent and to forward supplies. In July 1621 he sailed for America with his son Thomas, in the ship *Fortune*, and arrived at New Plymouth 21 November. In 1623, with Edward Winslow, he obtained from Lord Sheffield a grant of territory on Cape Ann and with a new band of devout colonists made the first permanent settlement within the limits of Massachusetts Bay colony. During his brief visit to the Plymouth settlement in December 1621, he preached a sermon on «The Sin and the Danger of Self-love», the first sermon delivered in America that was printed (London 1622). The original edition is of great rarity, only three copies being known to exist. The Charles Deane copy sold at auction in 1898 for $1,000. Reprints of it were published at Boston in 1724, 1780, 1870; at Plymouth 1788 and New York 1858.

CUSINS, Sir William George, English composer: b. London 1835; d. 1893. As a lad of 10 he sang in the Royal Chapel, and developing musical abilities, he was sent to Brussels, where he studied under the leading masters. He secured one of the most valuable scholarships in the Royal Academy of Music before he was 16 years of age, at which time he became organist to the queen. At the age of 32 he took charge of the Philharmonic Society, succeeding Sterndale Bennett, and took an important part in the musical development of England, being knighted for such service in 1892. His works include a Concerto in A Minor; a cantata; 'Gideon,' an oratorio; and a number of songs.

CUSK, kŭsk, *Brosme brosme*, a fish belonging to the cod family or *Gadidæ* (Cuvier), characterized by an elongated body, a single dorsal fin extending the whole length of the back, fleshy ventral fins and one barbel at the chin.

CUSPARIA BARK, the bark of the *Galipea Cusparia*, and some other species, also called Angostura bark.

CUSSO, cŭs'ō, *Hagenia abyssinica*, a small Abyssinian tree of the rose family (*Rosaceæ*), having pinnate leaves and diœcious flowers, which are imported into Europe and used as an anthelmintic.

CUST, Lionel, English art writer: b. London, 25 Jan. 1859. He was educated at Eton and Trinity College, Cambridge. Since 1901 he has been surveyor of the king's pictures and works of art. Among his published works are: 'Artists Represented in Department of Prints and Drawings in British Museum' (1893–96); 'Albrecht Dürer' (1897); 'History of the Society of Dilettanti' (1898); 'Sir Anthony Van Dyck' (1900); 'Van Dyck's «Chatsworth» Sketch Book' (1901); 'Portraits of Mary Queen of Scots' (1903); 'The Bridgewater House Gallery' (1904); 'The Royal Collection of Paintings, Buckingham Palace' (1905); 'Eton College Portraits' (1909); 'Notes on Pictures in the Royal Collections' (1911).

CUSTARD-APPLE, a common East Indian name for the fruit of certain species of the *Anonaceæ*, some of them the most delicious of the tropical fruits. The common custard-apple (*Anona reticulata*), a native of tropical America, is a large greenish or dark-brown fruit. The trees grows to considerable size. The alligator-pear, sour-sop and sweet-sop are members of the genus. The chief North American representative is the papaw (*Asimina* or *Uvaria triloba*). This tree grows to a height of 45 feet in favorable locations, the stem being sometimes 10 inches in diameter. The wood is soft, light and weak, weighing about 24 pounds to the cubic foot. The fruit is a fleshy berry, three to seven inches long, sweet, and edible when ripe, in October. The tree grows along streams from Ontario, through western New York and New Jersey near Pennsylvania, south to Florida and west to Texas and Michigan.

CUSTER, Elizabeth Bacon, American writer: b. Monroe, Mich., about 1844. In February 1864 she was married to George A. Custer (q.v.). She accompanied him in many of his campaigns on the frontier. She is author of 'Boots and Saddles, or Life in Dakota with General Custer' (1885); 'Tenting on the Plains, or General Custer in Kansas and Texas' (1887); 'Following the Guidon' (1891), etc.

CUSTER, George Armstrong, American general: b. New Rumley, Ohio, 5 Dec. 1839; d. 25 June 1876. He was graduated at West Point, 1861, was made second lieutenant and his first day at the front was at Bull Run, on Kearny's staff. He then went on W. F. Smith's, in charge of balloon reconnaissances; then, for daring courage and endurance, was appointed on McClellan's, and captured the first colors taken by the Army of the Potomac. In 1863 he went on Pleasonton's staff; shortly after, for dashing gallantry, was appointed brigadier-general of volunteers, commanding a Michigan cavalry brigade. He made it famous, and foiled Stuart at Gettysburg, for which he was brevetted major in the regular army. In 1864 his brigade was assigned to Sheridan's corps, and he was noted as one of the most brilliant officers in the Virginia campaigns, winning steady promotions; brevet lieutenant-colonel for Yellow Tavern, brevet colonel for Winchester. On 9 October, in command of the Third Division, he won the splendid victory of Woodstock; on the 19th, at Cedar Creek, he contributed largely to the Confederate defeat made permanently familiar by «Sheridan's Ride,» and was brevetted major-general of volunteers. In the spring of 1865 his division by itself won the battle of Waynesboro, capturing 1,600 prisoners and 11 guns; and followed it up by annihilating Early's command, and capturing all the rest of his artillery and his baggage. He fought at Five

Forks and Dinwiddie Court-House, and was brevetted brigadier-general United States army. After the surrender at Appomattox he was brevetted major-general United States Army, and appointed major-general of volunteers. Assigned to duty in Texas, then appointed chief of cavalry till mustered out of the volunteer service, he asked permission to accept Juarez's offer of the chief command of Mexican cavalry against Maximilian; refused leave of absence, he took the lieutenancy of the Seventh cavalry, and joined it at Fort Riley, Kan., November 1866, under Hancock, who was succeeded by Sheridan in the summer of 1867. Custer shortly after saw his first Indian service; and closed a campaign against the Cheyennes in 1868 by the crushing victory of the Washita (q.v.), where 103 Indian warriors were killed, and the tribe forced to return to their reservation. He was stationed in Kentucky 1871–73. In the spring of 1873 he was sent to Dakota to make head against an Indian insurrection of the first order, organized by Sitting Bull and Crazy Horse, and comprising not only the Sioux but a mass of other tribes in Dakota, Montana, Wyoming, etc. He fought a number of battles, and opened up the Black Hills country. In the spring of 1876 Sheridan made ready for a decisive blow, sending three divisions under Crook, Terry and Gibbon to unite and crush Sitting Bull on the Yellowstone. Terry and Gibbon united without discovering the Indian army; Crook beat up Crazy Horse's band, and after a sharp skirmish the whole Indian force of 5,000 or 6,000 moved to the Little Big Horn. They were discovered by Terry's scouts, and Terry sent Custer in advance, with his cavalry regiment of 600 men in 11 companies, to bar their escape east; he was to wait for the main body at the junction of the Big Horn and Little Big Horn 26 June. Custer arrived there the night of the 24th; his scouts discovered the Indian village the next morning; from imperfect information he supposed that they were only the 1,200 or 1,500 Pawnees he had known were marching to join Sitting Bull, and he resolved to surround and capture them all. The Indians were on a ridge west of the Little Big Horn; Custer kept five companies, 260 men in all, for a direct attack on the centre, gave four to Major Reno to assail their left (south), and two to Captain Benteen to make a southern detour of two miles and come on their right rear, cutting off their retreat. The Indians had broken up their tents and were about to retreat, when they discovered how weak was the assailing force. The three divisions forded the river, and Custer rode for the heart of the Indian line. A rise across the stream masked the enemy, many hundreds of whom lay in a ravine between it and the higher ridge beyond; and as Custer swept down, the savages rode against him and swarmed around to his rear. Outnumbered 20 to 1, the heroic band still fought their way up to the ridge, and a small number with their general reached it; then a fresh band of 1,000 Cheyennes rose up, under Rain-in-the-Face, and not a soul was left alive. Meantime Reno had been repulsed and had taken refuge across the creek; and Benteen never reached the neighborhood of the fight; but rejoined Reno at a bluff on the east, where they held the Indians at bay till Terry arrived next morning. The bodies of the slain division were left as they lay, all horribly mutilated, except Custer's. Forty-two Indians were killed. The battlefield has been marked with a small marble monument where each man fell. Custer wrote 'My Life on the Plains' (1874). His life has been written by Whittaker (1876). The general's wife, Elizabeth B. Custer, who accompanied him on his campaigns on the frontier published, 'Boots and Saddles, or Life with General Custer in Dakota' (1885); 'Tenting on the Plains' (1887); 'Following the Guidon' (1891).

CUSTER MASSACRE. See CUSTER, GEORGE ARMSTRONG.

CUSTINE, küs-tēn', **Astolphe**, MARQUIS DE, French novelist and writer of travels: b. Niederwiller, Meurthe, France, 18 March 1790; d. near Pau, France, 29 Sept. 1857. He traveled in the British Isles, Switzerland and southern Italy (1811–22), and afterward in Spain and Russia. He published 'Mémoires et voyages' (1830); 'La Russie en 1839' (1843); a tragedy, 'Beatrice Cenci'; and some romances, among them 'Aloysius, or the Monk of St. Bernard'; 'Romuald, or the Vocation.' His 'Letters to Varnhagen von Ense and Rachel Varnhagen von Ense' appeared in 1870.

CUSTIS, George Washington Parke, American writer: b. Mount Airy, Md., 30 April 1781; d. Arlington House, Fairfax County, Va., 10 Oct. 1857. He was a grandson of Martha Washington, his father being her son by her first husband. His daughter, Mary Randolph Custis, married Robert E. Lee, the Confederate general. He was adopted by George Washington, and wrote 'Recollections of George Washington' (1860), and several plays and orations.

CUSTOM is the legal term applied to unwritten law established by common consent and uniform practice from time immemorial. Something which, by its universality and antiquity, acquired the force and effect of law in the particular place or country in respect to the subject matter to which it relates; in other words such a usage as by common consent and uniform practice has become the law of the place or of the subject matter to which it has relation and which is therefore ruled as law by the court. Three axioms are founded on these definitions: (a) That custom is introduced by the people, under which name we understand the action or assemblage of persons of all descriptions of that country where they are collected. (b) That it derives its authority from express or tacit consent of the ruler. (c) That once introduced it has the force of law. Customs are general when as such they constitute a part of the common law and extend to the whole country, while particular customs are those which are confined to a particular district. As a rule, when a contract is made in relation to another, about which there is a well-established custom, it is presumed that such custom forms part of the contract and may be always referred to for the purpose of showing the intention of the parties in all those particulars which are not expressed in the contract. If, however, the meaning of the contract is certain and beyond doubt, no evidence of usage will be admitted to vary or contradict it. In order to give validity to a custom it must be certain, reasonable in itself, commencing from time immemorial, and continued without interruption. And a custom which is unreasonable, uncertain, and which savors too much of arbitrary power, is void; consequently where a custom is opposed to a well-settled rule of law, and is calculated and intended to violate such law, the custom will not be allowed to have any effect. The true office of a usage or custom with respect to contracts is to interpret the otherwise indeterminate intention of parties, and to ascertain the nature and extent of their engagements arising not from their express stipulation, but from mere implications and presumptions and acts of a doubtful or equivocal character, or to ascertain the true meaning of words in an instrument where those words have various senses; and custom or usage is sometimes admissible to add new terms not expressed in or covered by the writing. See Customary Law; Contracts.

CUSTOM-HOUSE, an establishment where commodities are entered for importation or exportation; where duties, bounties or drawbacks, payable or receivable upon such importation or exportation, are paid or received, and where ships are entered and cleared. In the United States, the custom-house of each port is under the direction of a collector of the port appointed by the President with the advice and consent of the Senate. He is responsible to the Secretary of the Treasury. The principal custom-house of the United States is in New York. Although import duties are one of the chief sources of revenue there is no separate bureau of customs as there is in the case of internal revenue. Supervision by the government of importations begins in the country of origin, where the value of the shipment is certified before United States consular officers. The customs regulations prescribe the methods of entry of goods, of valuation and classification, in order that the proper tariff rates may be levied at the port of entry. At the custom-house are collected the duties and storage, and warehouse space is provided for such goods as the importer does not wish to use at once, and on which dues are consequently deferred. The country for customs purposes is divided into districts in each of which is located a port of entry. The staff at the larger of these ports of entry comprises a collector, appraiser, naval officer, surveyor, gaugers and inspectors. In the smaller ports more than one office is often filled by one official.

The general customs procedure requires that each vessel carry a full manifest, or description of her cargo, giving names of the ports of origin and of the consignees. Revenue officers inspect this manifest before the vessel docks, and it is at once delivered to the collector of the port, who next issues a permit to transfer the cargo. The cargo is unloaded in presence of the collector or his representatives and the consignees must now present a detailed invoice which must state the value of the goods. The gross amount of the duty is now computed from this invoice and when it is paid, the consignees may remove the merchandise with the exception of those packages which are kept for examination. The appraisers now make a valuation according to those goods examined and they furnish the collector with sufficient data to enable the latter to determine the rate of duty to which the goods are subject. If the importer has paid too little or too much an adjustment is made by his paying the additional sum, or in case he paid too much he receives a refund. If dissatisfaction is expressed at the appraisal a reappraisal may be ordered. Appeals from the second decision may be taken to the board of general appraisers, and in certain cases to the United States Court of Customs Appeals. Fines, penalties and forfeitures may be imposed for undervaluation, or in general for any attempt to evade the payment of duties according to the schedules fixed by law. In general the customs officials of the United States have little discretionary power compared with those of other countries. However, the customs regulations in the United States provide greater remedies for errors or unjust exactions of any kind. See Customs Duties; Tariff Administration.

CUSTOMARY LAW is that law which has for its basis — usage, and therefore may be abrogated by usage. It derives its whole authority from the silent assent of those who are affected by it. A usage cannot be sustained in opposition to well-established principles of law. To sustain a usage under such circumstances would be extremely pernicious in its consequences, and would render vague and uncertain all the rules of law. A mere custom or usage is therefore without force in opposition to a positive law. Thus a usage for factors to pledge the goods of their principals is void, being against a general rule of law. So the usage for a master of a vessel to sell the cargo without necessity when the vessel is stranded; so of a custom, different from the law in a certain place, to re-enter for a forfeiture incurred by the non-payment of rent. And it is held that the custom and understanding of the merchants in a particular trade cannot be admitted to prove that the barter or exchange of a promissory note, endorsed without recourse, for cotton or any other species of merchandise, carries with it no implied warranty of the past or future solvency of the maker of the note. So where a transaction is within the statute against usury, the usage of trade as to such transaction cannot be received in evidence to show that it is not usurious. Known and settled usages, however, are respected by courts and juries, unless such usages are against the laws or policy of the country. Usage is evidence of the construction given to the law, and when it is established and uniform it regulates the acts and duties of those who act within its limits. Usage is a matter of fact, and not of opinion. A usage of trade must therefore be proved by instances, and cannot be supported by evidence of opinion merely. It is proved by witnesses testifying of its existence and uniformity from their personal knowledge obtained by observation. Customary or Common law was introduced into the United States based on English common law, which in its most comprehensive sense embraces general customs pervading the whole realm, particular customs prevailing only in certain places and particular laws which by degrees have been incorporated into the common law to a certain extent. In its more ordinary acceptation, however, the common law includes only general customs and particular laws, and not customs of particular places. In this manner in England Christianity was early recognized as a part of the customary or common law of the land, when a lord chief justice ruled that "Christianity is parcel of the laws of England" and to cast obloquy upon its precepts is to speak in subversion of the law. Such restriction, however, was not intended to consider as reprehensible honest, sincere and conscientious disputes between learned men upon particular controverted points incident to its doctrines. In the United States an intermediate ground is maintained; the one best supported by both reason and authority is that acts conducive to the subversion of the Christian faith or which are calculated to bring into contempt or ridicule its tenets and symbols, and contumelious attacks upon its laws and institutions, are temporal offenses; not because Christianity is a part of the law, but for the reason that such acts tend to a breach of the law and so jeopardize the public welfare. See CUSTOMS.

CUSTOMS COURT. See UNITED STATES CUSTOMS COURT.

CUSTOMS DISTRICT. See DISTRICT.

CUSTOMS DUTIES, the portion of a state's revenue derived from a tax on imports. In some countries, customs duties are imposed on certain exports also. The origin of the term is connected with the long conflict between the Crown and Parliament as to the right of taxation, although the practice it signifies goes back to the days of Greece and Rome. To meet the claims made by the House of Commons to the exclusive right to vote all supplies, it used to be maintained that there were certain duties on exports and imports to which the Crown had acquired a right by *custom* (although it is certain that customs duties existed in England prior to the Norman Conquest), and after the power of Parliament over this branch of taxation had been fully established it retained its old name. This tax, which originally was a sort of premium of insurance for protection from robbery, after the excise came in force was always applicable distinctively to goods changing place. There were customs not only upon things leaving and things entering the British dominions, but also upon commodities transferred from one part of the country to another. In Scotland the duty on commodities imported into any town from a foreign country was called the great custom; and the duty charged by a burghal corporation on commodities coming within its walls from the country districts was called the small or petty customs. After 1707 the Scottish customs duties became the same as those of England. At present the term customs duties applies in the United Kingdom solely to the tax levied on commodities imported from abroad.

The tax on imports was, of old, a simple percentage, familiarly known as "tunnage and poundage," from the method to which it was levied on the tun of wine, or the pound ad valorem of other merchandise. These were subsidies granted first to the Crown, and then for the maintenance of the authority and dignity of the state. Thus they were a species of public revenue; and many complications arose by the additions and alterations of successive governments. The belief also arose that customs duties might be utilized for fostering domestic industries and discouraging foreign competition. Frequently the duties were such as to act as a prohibition to importation, and they always added greatly to the selling price.

In 1825 the laws of the British customs were consolidated into about half a dozen statutes. Some idea of the confused and cumbersome condition of the customs system before that year may be gathered from the fact that the number of acts repealed then was 443. A long list of customs duties remained until the free-trade legislation of 1846. One by one articles of food were exempted; and at present the whole British customs revenue is derived from spirits, wine, tobacco, coffee, tea and certain dried fruits. In modern times taxes upon exports have been discarded by most states, although several states of Latin-America are dependent on them for the bulk of their revenue. In the United States the number of dutiable articles is large, of the total imports the dutiable have about double the value of the free goods. The dutiable articles come under 386 paragraphs, which are again classed under schedules lettered from A to N. The free list comprises 271 paragraphs. For a discussion of the relative effects of a tariff for revenue and a protective tariff, specific and ad valorem duties, American practice contrasted with European, see FREE TRADE; PROTECTION; TARIFF; TAXATION.

CUSTOZZA, koos-tōt'sä, Italy, a village in the province of Verona, about 10 miles southwest of the city of Verona. It is noted as being the place where the Italians were twice defeated by the Austrians in 1848 and 1866. In 1879 a monument was erected to the fallen. Consult Mathes von Bilabruck, 'Taktische Studien über die Schlacht von Custozza im Jahre 1866' (Vienna 1891).

CUT GLASS. See GLASS, VARIETIES OF; GLASS, ORNAMENTATION OF.

CUT-WORM, the caterpillar of an owlet moth of the tribe of *Noctuæ,* and group *Agrotididæ;* and, loosely, many other grubs and worms living in the ground. It stays by day about the roots of plants, and comes forth at night to cut off their tender stems and leaves. Some of the moths fly by day, others only at night; the wings are nearly horizontal when closed; the thorax smooth and slightly convex; the antennæ of the males generally with two rows of tooth-like points on the under side; the fore legs are often spiny. They destroy whole fields of vegetables, and also asters, balsams and other ornamental plants. The caterpillars vary in length from one to two inches, and are dark ashy gray, with brown head, and a pale dorsal stripe, with minute black dots; the chrysalis is a shining dark brown, and the moth appears from 20 July to the middle of August. The chrysalis is transformed in the ground, without a cocoon. The only effectual way to prevent their depredations is to open the earth daily at the foot of the growing plants and kill the worms, which are easily found. It is said that a manure of sea mud will protect a garden from these worms; some cultivators protect their cabbage plants by wrapping a walnut leaf or paper cone firmly around the root, secured by an earth embankment.

CUTANEOUS SENSATIONS. Those sensations experienced from the excitement solely of the organs of the skin. Although psychologists have been in wide disagreement as to the seat of many specific sensations, it seems now to be definitely decided that sensations of the skin are only four in number: pressure, warmth, cold and pain. Other experiences formerly classified with these, as hardness, dryness, smoothness, etc., are regarded as being composite in character, including muscular sensations, and partaking more of the character of perceptions.

In the study of cutaneous sensations the method employed is an «exploration» of the skin with various instruments, such as a pointed bit of wood or cork, a knitting needle, a fine broom splint or a bit of horse hair. When the skin is touched gently at different places in a small area, it is found that at some points the sensation of pressure is acute, at others dull. In the latter instance it is believed that the sensation is not from the point touched, but from some neighboring point. In the same way the skin is explored with hot and cold instruments and with sharp-pointed needles. It is found that there are many areas of the skin which are entirely insensible to the prick of a needle which at other points is exquisitely painful. An interesting fact is that in some areas of the skin sensations of cold are excited by the touch of a warm object. These are called «paradox sensations.» They are attributed to special nerve structures which always respond with the same sensation regardless of the exciting agency. It has been found that children generally have a much more delicate and accurate sense of touch than adults have. This is ascribed to the probable fact that the nerve structure conveying these sensations is complete in the child, and as there is a much smaller skin surface in the child, the nerve ends are, of course, closer together. Consult Angell, J. R., ‘Psychology’ (New York 1908); Harvey, N. A., ‘Physiological Psychology’ (Ypsilanti, Mich., 1911); Ladd, G. T., ‘Elements of Physiological Psychology’ (New York 1900); Scripture, E. W., ‘Thinking, Feeling, Doing’ (New York 1907); Wundt, W. M., ‘Principles of Physiological Psychology’ (Titchener's translation, New York 1910).

CUTCH, kŭch, India, a principality controlled by Bombay, lying to the south of Sind, area, about 7,616 square miles, between the marshy tracts of the Rann of Cutch and the Gulf of Cutch. During the monsoon it is wholly inundated by water, the vast salt morass of the Rann separating it on the north and east from Sind and the Guicowar's dominions. It has a feudal system of government, the ruling power being confined to the dynasty of Jharija Rajput, of which there are about 200 members. About one-third of the inhabitants are Mohammedans, the rest Hindus of various castes. Chief town is Bhuj. Pop. about 525,000.

CUTCH (Malay, *katchu, catechu*), a commercial substance obtained from the *acacia catechu* and the bark of mangrove trees. Cutch is used in tanning and as a preservative for nets and sails. The wood is chipped, boiled and the cutch thus extracted. Large quantities are produced on the island of Borneo.

CUTCH, Gulf of, an inlet on the north border of the Arabian Sea, extending into the west coast of India about 100 miles, and forming an outlet for the salt marshes of Cutch in India. It is about 30 miles wide and 100 miles long and connects at its upper end with the Little Rann (or Runn) of Cutch, and through this with the great western Rann.

CUTCH GUNDAVA, Baluchistan, a division occupying a northeast projection, in a great measure separated from the rest of the country by the mountain range of Hala. The area is a desert, with an annual rainfall of but three inches, but the soil under irrigation yields bountiful crops of grain and cotton. The summer winds are extremely hot and unendurable. Area, 10,000 square miles. Pop. 120,000.

CUTHBERT BEDE. See Bradley, Edward.

CUTHBERT, Saint, English anchoret, cenobite and bishop: b. about 633; d. Farne, Northumbria, 20 March 687. He is one of the three most eminent saints of the Church in England, the other two being Saint Edmund of Edmundsbury, and Saint Thomas à Becket, archbishop of Canterbury. The time and place and even the country of his birth are unknown, but the most trustworthy historians say he lived from 635 to 687. In his youth he entered the monastery of Melrose (the first Melrose), at that time within the limits of Northumbria, and after making his religious profession there was successively prior of that abbey, prior of Lindisfarne, bishop of Hexham and bishop of Lindisfarne, with intervals in which he withdrew from conversation with all men and lived a recluse hermit on the island of Farne. The fame of his sanctity, religious zeal and miracles was great in his lifetime; but grew steadily greater after his death, and many churches in England were dedicated to him. It is said that his body was found incorrupt when his tomb was opened 11 years after burial. When Norse corsairs threatened Lindisfarne in 875, the monks of Lindisfarne bore the remains to a place of safety inland, and for a time the body had no fixed resting place until deposited at Durham, where, enclosed in a splendid shrine, it remained till the Reformation, an object of veneration and the supposed instrument of incessant miracles. At the Reformation the shrine, with its costly ornamentation, went to increase the king's treasure, and the body of Cuthbert was buried under the pavement of the Durham Cathedral. The coffin was lifted in 1827 and the body, or rather the skeleton, of the saint, was found wrapped in five robes of embroidered silk; there were three coffins, one within another, namely, an outermost one, made in 1541, within that another, believed to date from 1104, and then the *cista*, in which the relics were deposited when the body was disinterred in 698. His feast is observed on 20 March. His life has twice been written by the Venerable Bede and still earlier by a monk of Lindisfarne. Beside these are modern works, by Raine (Durham 1828); Eyre (London 1849; 3d ed., 1887), and Fryer (London 1880).

CUTHBERT, Ga., the county-seat of Randolph County, on the Central of Georgia and the Georgia, Florida and Alabama railroads. The town is the trading centre of a fruit-growing and cotton-raising region, and has two colleges, the Andrew Female College, opened in 1854, and the Bethel Military College for men. Other industries are farming, fertilizer manufacture, grist-milling, cotton-oil and gin-making.

The city owns its waterworks and electric-light plant. Pop. about 3,000.

CUTICLE (Lat. *cuticula,* diminutive of *cutis,* "skin"), a thin, white, pellucid, insensible membrane, covering and protecting the true skin, with which it is connected by the hairs, exhaling and inhaling vessels and the *rete mucosum.* See SKIN; ANATOMY.

CUTLASS (Fr. *coutelas,* "small knife" or "sword"), a short sword used by seamen. The blade was usually about 27 inches long, an inch wide and had a bowl-shaped guard on the hilt. It is a very effectual weapon in close contest; on account of its shortness it can be handled easily, and yet is long enough for defense.

CUTLASS-FISH. See SCABBARD-FISH.

CUTLER, Manasseh, American Congregational clergyman: b. Killingly, Conn., 3 May 1742; d. Hamilton, Mass., 28 July 1823. He was graduated at Yale in 1765, became a lawyer in 1767, and Congregational minister in 1771 at Hamlet Parish, Ipswich, now the town of Hamilton, Mass., and a chaplain in the Revolutionary army in 1776. After the war he helped form the Ohio Company, which settled Marietta in 1788, and had a leading part also in the formation of the State of Ohio, being credited with drafting the noted "Ordinance" of 1787. He was a member of Congress from Massachusetts 1800–05. He was also a botanist of distinction, describing 350 species of plants native of New England. Consult Cutler, W. P. and J. P., 'Life Journals, and Correspondence of Manasseh Cutler' (Cincinnati 1888).

CUTLER, Timothy, American clergyman: b. Charlestown, Mass., 1683; d. Boston, August 1765. He was graduated at Harvard in 1701; was a Congregational pastor at Stamford, Conn., 1710–19, when he became rector of Yale College. In 1722, convinced of the non-validity of Congregational ordination, he became a believer in Episcopacy, and was dismissed by the trustees of Yale. Going to England, he was ordained by the bishop of Norwich in 1723, received the degree of D.D. from both Oxford and Cambridge and was appointed a missionary of the Society for the Propagation of the Gospel. Taking charge of Christ Church, Boston, Mass., 1723, he remained its rector until his death. He was throughout his later life one of the most influential of the colonial clergy. Some of his letters appear in Nichols, 'Illustrations of the Literary History of the Eighteenth Century' (London 1817–58).

CUTLERY. Cutlery broadly considered may include any article with a cutting edge. From a trade and makers definition, it comprises only pocket knives, table knives, razors and scissors. These are four distinct and separate trades, and although all four are often carried on by one firm, many manufacturers confine themselves to one branch only. Pocket knives generally include all kinds of spring knives, hunting knives, etc., and table knives include carvers, butchers' and cooks' knives. In each of the four divisions of the cutlery trade, the process of manufacture is somewhat similar.

Pocket Knives.— In olden times the same man made the blades, ground and finished, and fitted them to the handles, which he also made. With the development of the factory system, each branch became divided into three separate trades, viz., forgers, grinders and cutlers or hafters. Taking the process of manufacture in spring knives as typical of all branches, and as followed in Sheffield, England, and elsewhere in the old established way and carried on by those firms who have maintained a reputation for quality, many methods have been introduced in different countries to substitute various machine processes for producing blades other than forging by hand, but nothing quite to equal the hand-forged article has been produced. The steel, which should be converted from the finest brands of Swedish iron, is melted, cast into ingots, then hammered into bars and rolled in strips of width and thickness suitable for the sizes of blades required. The blade maker or forger takes one of these strips, cuts it into convenient lengths, heats to a warm red a portion of one end, sufficient for a blade, in a clean fire of small coke, roughly hammers out the required blade and chops off from the string of steel just enough for this and the tang (i.e., the part of the blade by which it is fastened into the haft). This process is called mooding, the workmen making as many moods as required for the quantity ordered, or for his day's work. He then reheats these moods separately, and with a hammer on the various bosses fixed in his anvil, or stithy, works the tang into the required shape; the other end, the cutting portion of the blade, is then reheated, the nail mark put in on a boss for that purpose fixed in the anvil, the sides hammered flat, and edge of blade as thin as possible. This is all done at one heat, and is called smithing. It is this hammering from hot to cold that imparts the lasting cutting qualities, provided the blades are made of good steel. The blades then go to the grinder, who "lays on" the tangs, i.e., he grinds off the rough surface on that part on which the name is put; this is done by the marker with a punch used either by hand or in a fly. The blades then go back to the forger to be hardened and tempered. Each blade is heated separately and dipped in water, after which it is of a whitish gray color, having shaled — i.e., a thin outer surface has peeled off. The blade is now quite brittle, and requires tempering; this is done by slowly heating on a steel plate over the same fire as used for forging. The degree of temper required is judged by the color and goes from a light straw to tawny yellow, reddish brown or blue according to the different styles of blades and purposes for which they are used, pen blades being generally left a straw color, and pockets a reddish brown. The blades are now ready for the grinder. This man sits on a horsing,— a kind of wooden saddle,— partly under and in front of which between his legs runs a stone in a trough with sufficient water in the bottom to just catch the surface of the stone and keep it constantly wet. Grindstones vary in diameter according to the class of work to be done, and run from about 14 inches for small pen blades, to five feet for carvers, but the grinding of each is restricted to its separate trade. The blades are set in (put into handles) in the rough ground state. In some cases in jack knives the grinder also finishes the blades, but generally this is done by others after the blades have been fixed in the hafts by cutlers. The cutler is given the necessary parts, blades, springs, scales and covering, and works these into the knife. Springs are filed out of sheet steel, except in the case of pruners and large jack knives, for which they are often forged by a spring forger; another separate trade for the workman. The spring forger also makes some kinds of scales, viz., those used for large pruning and sporting knives, and various articles other than blades that are put into knives. Generally the scales are made by scale makers, another subsidiary trade, and the covering of stag, ivory, pearl, horn, bone or wood of various kinds comes from the cutters of these several materials. The cutler works to templates, or as he calls them "fitting things." This is the most complex and ingenious of the three branches in the trade; he has to bore and file each spring to his measure, harden, temper and finish the same, bore tang of blades, and fit to measure and finish the edges — fit to measure plate and bore the scales, put on the covering after the necessary preparing, then nail the several parts together and get up the haft. This is done by different degrees of filing, and grinding on glazers (wooden wheels bound with leather and dressed with glue and emery of various grades). Stag is finished on brushes, the smooth coverings on buffs or dollies. The buffs are wheels similar to glazers, with softer leather, dressed with oil and rotten-stone or rouge, and the dollies are made with layers of cotton cloth between side plates, and dressed as buffs. The cutler having made up the various parts into knives, the blades, being unfinished, have to go back to the grinder or finisher to be either glazed or polished, as required. For this, handles are wrapped up in paper or anything else that will keep them clean, and the blades left open — not more than one at each end at once. The pocket blades are whitened, i.e., reground on a harder stone than that used for grinding, then glazed, first on a rough and then on a finer glazer, and buffed to give a brighter finish,— if required polished they go from the fine glazer to a small wooden wheel bound with leather and dressed with crocus, and which runs much slower than grindstones or glazers. With pen blades of any quality the sides are lapped instead of glazed, i.e., the wheel on which this is done is bound with lead (run on in a mold) instead of leather; by this means a truer and better cutting edge is secured. The cheaper qualities of pen blades are finished on the glazers, either leather bound, or made of wood, without any covering, but blades so finished are inferior to those that are lapped. If polished the pen blades go from the lap to the polish as in the case of pocket blades. After finishing, the blades are wiped and greased, joints cleaned, and the knives then go to the whetter, who rubs the edges on a hone (oil stone) to remove the rough edge left by finishing. This is often done by women or girls, but the better work is always done by men. The whetter rubs the blade backwards and forwards on his stone at a slight angle so as to leave a thin white line called the kennel along the edge on either side of the blade. The knives are then wiped by women, joints oiled, wrapped up and put in boxes, and are ready for market.

Table Knives.— The process of making these is similar to that of spring knives; though the workmen employed are entirely different. The trade comprises three branches of men, forgers, grinders and cutlers, as in spring knives. The men in one line of the cutlery trade never work at any other of the sections, i.e., spring knife men in any of the three branches do not work at table knives, razors or scissors in the same branch; that is to say, a blade forger in the spring knife section does not make table blades, razors or scissors. The better table knives are made from shear steel, and are hand forged; this is too expensive for the greater part of the trade, so cast steel is used and forged with machines called goff hammers; cheaper blades still are filed out of sheet steel. The table knife requires a different edge from a pocket knife, which has a smooth stiff edge, but for cutting soft substances such as meat, a thin rough edge is wanted. This is only obtained in perfection from shear steel, and though cast steel may answer fairly well for table knives, it is not satisfactory for carvers. Shear steel is made by welding together several lengths of blister steel (i.e., iron simply converted into steel). When these come from the converting furnace they are cut into shorter lengths about three and one-half feet long, and will be about three and one-half inches wide by one and one-half inches thick. Six of these are put together in a clamp at one end; the other end heated, worked into a bar under a steam hammer; the same is done with the other end, and the whole reduced by hammering to a bar about one and one-half inches by one inch; this is called single shear. For double shear the same bar is bent over, bringing the two ends together, and put through the same process of hammering again. The bars are then rolled to the sizes required for forging. The forgers work double handed, one called the striker, the other the maker. They stand opposite each other, hammering at the same blade at the same time, striking alternately, the maker holding the blade with one hand, and using a hammer in the other, the striker using a two-handed hammer. When the maker is finishing each blade (smithing it) the striker will be hardening and tempering. In hand-forged blades, the cutting part of the blade only is made of steel; the tang (that part which goes in the handle) and the bolster (the thick part of blade where it joins the handle) are of iron, which is welded on to the steel by the forgers in process of making. The blades first being mooded (rough forged) iron for tang and bolster welded on, tanged, smithed, hardened and tempered, the table knife grinder grinds and finishes the blades right out before they are set in the haft by the cutler. After the handles are on and finished the blades are buffed again to remove scratches, and whetted on a dry, fine sandstone. In a cheaper but less effective way this whetting is done on dry grindstones.

Razors.— These are made of cast steel of fine and hard quality, but not as tough as that used for spring knives, as they are required to stand no bending strain. They are mostly hand forged, but many are now stamped in dies under power hammers, which process is found more satisfactory for razors required to be hollow-ground, as they can be stamped hollow; but for flat sides, of which large quantities are made, the hand forging is more effective. The grinding of razors is done in the same manner as of spring knives, the blade being finished (glazed or polished) and etched if required, before the fitter, called the setter-in, puts them in hafts. The hollow-grinding of razors is quite a fine art. Until a few years ago this was done on stones of various sizes down to some of not more than one-half inch in diameter. Emery wheels are now almost universally used for this purpose. Quite a variety of patent machines are now used for hollow-grinding. Razors are whetted on finer and harder stones than spring knives, and afterward stropped, wiped and done up in cases ready for use.

Scissors.— The best are hand forged, but good ones are also made from blanks stamped out of sheets of cast steel and moulded in dies. This is becoming the general process, and, provided the material is good, the result gives all that is required. In large sizes of scissors only the cutting edge is made of steel, which is welded on to iron; these are called "shot scissors." In common and cheaper qualities the blanks are cast, i.e., the metal is run into molds. The other processes of grinding, finishing and fitting scissors are somewhat similar to those described for knives.

The four trades described constitute what is technically included under the term of cutlery, but there are certain side lines to some of them which also come under that heading, for instance, some spring knife manufacturers will also make tea pruners, farriers' knives and some kinds of surgical knives; in other instances, each of these may be carried on as separate trades, but all will be included under the title of cutlery. See HARDWARE.

American Practice.— While the processes of the manufacture of cutlery in the United States are generally the same as in England, a very much larger part of the work is done by machinery. For nearly all grades of knives and razors the forging is done with a trip hammer, and, a relatively higher quality of steel being used, the results are comparable in excellence with the best hand-forged English blades. For cheap knives, the blades with tangs attached are blanked out of sheet steel and given their proper shape with dies in a hydraulic or other form of heavy power press, the operation being continuous, as the long strips of steel are fed into the machines in constant succession. Even the hardening and tempering are done automatically at the rate of 1,400 to 1,800 per hour. Most of the grinding also is done on automatic machines, and far more accurately than by hand-work however skilled. The handles are formed and finished without hand labor, leaving only the assembling of the parts to the handworker.

Some razor blades are hand-forged but the large majority are moulded in dies in heavy presses with a very great saving of time. By the use of heated presses the quality of the metal is preserved even more perfectly than in hand-forging.

In 1914, as determined by the special census of manufactures in that year there were in the United States 27 establishments, with 3,832 employees making table cutlery; 28 establishments, with 1,620 hands making plain and safety razors; 29 establishments, with 1,925 hands making shears and scissors; and 32 establishments, with 3,894 hands making pocket knives. Their combined capital was $22,670,000, and their yearly output was valued at $16,996,000.

Upon the outbreak of the European War the American cutlery trade experienced an enormously increased demand. Not only had a large proportion of the local trade in cheap cutlery been in the hands of German manufacturers, but these concerns had also had a practical monopoly of the cheap cutlery trade of Latin America. This was entirely cut off, and the demand shifted in part to American makers, and in part to English houses. As the war proceeded the cutlery factories of England were drained of many of their workers so that more and more of the demand has come upon American manufacturers. In 1917 these cutlery plants were doing from 30 to 50 per cent more work than in 1914, and supplying not only Latin America but also Australia. A comparison of the figures for the imports and exports of cutlery of the United States for the two years 1914 and 1917 indicate the great change which has taken place in this industry. In 1914 there were imported into the United States (chiefly from Germany, but in part from England, 16,297,764 pocket knives, valued at $1,288,037; razors to the value of $457,460; scissors and shears, 594,017 dozen, valued at $759,487; and other cutlery valued at $355,535 — a total value of $2,860,519. In that year the exports were valued at $1,147,995. In 1917 the imports were 52,936 pocket knives; 23,710 razors; and 83,614 scissors and shears — a total value of $283,206. The exports for 1917 were razors to the value of $2,505,117; table cutlery to the value of $627,031; and other cutlery to the value of $2,769,483 — a total of $5,901,631. Consult Lloyd, G. I. H., 'The Cutlery Trades' (London 1913); and *Reports of the United States Bureau of Foreign and Domestic Commerce* (Washington, monthly).

CUTLIPS, a fish, one of the suckers (*Lagochila lacera*) of the lower Mississippi Valley, whose mouth has a lower lip divided into two lobes, so that the fish is sometimes known by the names, "hare-lip," "rabbit-mouth," "May-sucker," etc. Its upper surface is olive-brown in color, while the under parts are silvery. A long fissure concealed by the cheek entirely divides the lower and upper lips at the angles of the mouth. This fish whose appearance is most singular has no great commercial value.

CUTTACK, kŭt-tăk', India. (1) An executive district in the lieutenant-governorship of Bengal, province of Orissa; area 3,633 square miles. On the coast is extensively manufactured the best and whitest salt made in India. Pop. 1,937,671. (2) The capital of the district of Cuttack, on the Mahanuddy River, 220 miles south of Calcutta, is chiefly noted for filigree-work in gold and silver. A canal extends to False Point. It is the seat of Ravenshaw College. Pop. about 50,000. (3) The Cuttack Mehals or tributary states of Orissa, a group of about 20 small native states in the northwestern part of Orissa. They are subject to 21 rajahs, tributary to Great Britain and have an area of 14,387 square miles. Pop. 1,696,710, principally hill-men of various tribes.

CUTTAGE, the propagation of plants by means of slips or cuttings which are detached parts of roots, stems, leaves, etc. This form of asexual or bud-propagation is found in nature among willows, poplars and many other trees and shrubs, especially such as are readily broken by wind and drop their twigs and branches into streams and ponds with muddy shores. Artificially, it is one of the oldest methods known and is of wide importance, ranking with graftage (q.v.) and seedage. The advantages of cuttage are that, with the rare exceptions due to bud variation, plants may be propagated true to variety or species in very great number, and the cost of production of the kinds commonly so propagated is small when compared with certain other methods such as division and layerage, in which cases roots are developed before the removal of the parts which become new individuals. An idea of the scope of this practice may be obtained from the fact that, except in the production of new varieties which are obtained by means of seeds, the great majority of florists' perennial plants such as roses, carnations, violets, chrysanthemums, are so obtained, as are also many fruit plants such as gooseberries, currants, grapes and pineapples, though in the last instance other methods are also used to a large extent.

The methods for making the cuttings «strike» root are very various. Some species such as currant and gooseberry will soon produce roots if plunged in moist soil out of doors; others must be grown under glass, often with extra degrees of heat in the soil (bottom heat), in propagating boxes (glass-covered frames upon the greenhouse benches), and other devices, as well as specially favorable soils, etc. The methods of making the cuttings also differ widely with the species of plant and the part used, as the following classification will show:

CUTTINGS.

Roots or Rootstocks	Stem	Leaf
Short, under glass, Dracæna.	Growing wood, Soft-Fuchsia. Hard-Rubber plant.	Entire, laid flat on surface, Begonia.
Long, in open air, Blackberry.	Ripened wood, Long, in open air, Currant.	Divided, Begonia, Rex
By tuber cuttings, Potatoes.	Short, under glass, Yew.	Bulb Scales, Lily.

As a general rule, to secure the best success with cuttings, a well-drained, sandy soil is necessary, and, in most cases, it is desirable to have bottom heat. Consult Fuller, 'The Propagation of Plants' (New York 1887); Bailey, 'The Nursery-Book' (New York 1896); id. article «Cuttage»; 'Cyclopædia of American Horticulture' (New York 1900-02).

CUTTER, Ephraim, American physician: b. Woburn, Mass., 1 Sept. 1832; d. West Falmouth, Mass., 25 April 1917. He was graduated at Yale University in 1852; practised medicine in his native city till 1875, in Cambridge and Boston till 1881, when he removed to New York and began practice there. He has invented a large number of surgical instruments; contributed over 400 articles to literature on scientific subjects, including microscopic medicine, laryngology, chronic diseases and general medicine; and became a member of the Massachusetts Medical Society in 1856, and of the American Medical Association in 1871. He was a pioneer of American laryngology; he studied the morphology of raw beef from 1854 and discovered the tuberculosis cattle test in 1894.

CUTTER, George Burton, Canadian educator: b. Amherst, Nova Scotia, 11 April 1874. He graduated B.A. at Acadia University, Wolfville, Nova Scotia, in 1896 and at Yale in 1897 (B.D. 1903). Ordained to the Baptist ministry in 1897, he held pastorates successively at Montrose, New Haven, Conn., Corning, N. Y., and Columbus, Ohio. In 1910 he was appointed president of Acadia University, Wolfville, Nova Scotia, holding at the same time the chair of psychology of religion and pedagogy. He is the author of 'The Psychology of Alcoholism' (1907); 'Psychological Phenomena of Christianity' (1908); 'Three Thousand Years of Mental Healing' (1911).

CUTTER, George Washington, American poet: b. Massachusetts 1801; d. Washington, D. C., 24 Dec. 1865. He practised law in Kentucky until 1845; served as a captain in the Mexican War; became active in politics, and received a treasury clerkship. His poems are nearly all included in 'Buena Vista, and Other Poems' (1848); 'Song of Steam, and Other Poems' (1857); 'Poems, National and Patriotic (1857).

CUTTER, a name given to two kinds of small vessels. The first is one of the supplementary small-boats of a man-of-war equipped for both rowing and sailing. The cutters used by yachtsmen and by pilots, and revenue cutters are built with especial reference to speed, and have a single mast, and a «single-stick» straight-running bowsprit that may be housed in-board in dirty weather. They are much like the sloop in rig. The hull of the cutter is very deep and narrow, being almost V-shaped, with an almost perpendicular rise from the floor to the bulwarks, and a keel heavily loaded with lead. In heavy weather, working to windward, the cutter shows to best advantage. (See YACHTS and YACHTING). A light sleigh with a single seat is called a cutter in some parts of the country. A revenue cutter is a light armed government vessel commissioned for the prevention of smuggling and the enforcement of customs regulations. See REVENUE CUTTER SERVICE, UNITED STATES.

CUTTING, Mary Stewart Doubleday, American author: b. New York, 27 June 1851. Early in life she had verses published in *Lippincott's Magazine*. She married Charles Weed Cutting in 1875, wrote verse occasionally and finally drifted into the short-story field about 1894. She has published 'Little Stories of Married Life' (1902; 2d ed., 1909); 'Heart of Lynn' (1904); 'Little Stories of Courtship' (1905); 'More Stories of Married Life' (1906); 'The Suburban Whirl' (1907); 'The Wayfarers' (1909); 'Just for Two' (1909); 'The Unforeseen' (1910); 'The Lovers of Sanna' (1912); 'Refractory Husband' (1913); 'The Blossoming Rod' (1914).

CUTTING, R(obert) Fulton, American financier: b. New York, June 1852. He received his education at Columbia University, where he was graduated in 1871. Becoming interested in social problems and political reforms he was, in 1892, made president of the Association for Improving the Condition of the Poor and, in 1899, of the New York Trade School Association. A member of the Citizens' Union and of the Bureau of Municipal Research, he contributed large sums to the political reform work of both these bodies. He is chairman of the board of the City and Suburban Homes Company, trustee of the American Exchange National Bank, the Mexican Telegraph Company, and the American Museum of Natural History. He wrote 'The Church and Society' (1912), the Kennedy lectures before the School of Philanthropy, New York.

CUTTING, Starr Willard, American educator: b. West Brattleboro, Vt., 14 Oct 1858. In 1881 he was graduated at Williams College and from 1881 to 1886 served as principal of the academy at Deerfield, Mass. He next prosecuted his studies at the universities of Leipzig, Geneva and Johns Hopkins, and became connected with the faculty of Chicago University. In 1906 he was made head of the department of Germanic languages and literatures at the latter institution. He published 'Der Konjunktiv bei Hartmann von Aue' (1894); 'The Modern German Relatives "Das" and "Was"' (1904); 'Robert Wesselhoeft, Jena Burschenschafter, German Revolutionary and American Citizen' (1911), and editions of German school texts.

CUTTING, a detached part of a plant used for propagation. Cuttings may consist of the growing wood of the stem, as in *Verbena* and the tea roses; of the ripened wood, as with the grape, the willow and most deciduous trees; of the rootstock, as with Arum; the root, in the case of the blackberry; the leaf, for example in Begonia; or bulb-scales, as with the lily. Propagation by cuttings is resorted to for many different reasons. In many plants seeds are hard to get, or when they are obtained, propagation by seeds is long and expensive, while propagation by cuttings is quick and cheap. For example, the potato rarely sets seed. Again, the willow will propagate itself under the most untoward circumstances by means of cuttings, while seedlings are of course much more tender. Furthermore, seedlings of hybrid varieties or of seed or bud sports will not in general breed true, and it is the rule among cuttings to be accurate reproductions of the parent plant. Moist sand is generally the most favorable medium in which to plant cuttings. Consult Lindley, 'Theory and Practice of Horticulture'; Burbidge, 'The Propagation and Improvement of Cultivated Plants'; Henderson, P., 'Practical Floriculture.'

CUTTLE, Captain, a character in Dickens' 'Dombey and Son.' He is a retired merchant-captain with a hook in place of a right hand. He received and cared for Florence Dombey. His favorite expression, "When found, make a note of" was adopted as the motto of 'Notes and Queries.'

CUTTLE-BONE, the dorsal plate of *Sepia officinalis,* formerly employed in medicine as an absorbent, but now used for polishing wood, painting, varnishing, etc., for pounce and tooth-powder and to supply cage birds with lime and salts.

CUTTLEFISH, a common name for the Cephalopods, but originally applied to a member of the genus *Sepia.* In the United States it is restricted to the octopods (q.v.). The cuttlefish proper, *S. officinalis,* measures from 6 to 10 inches in length, and its color varies from pale-gray to dark-brown or neutral tints. The body is oval, flattened from above downward, and contained in a tough muscular sac (mantle), which expands along the whole of either margin into a narrow fin. The integument consists of a single layer of cells, lying upon connective tissue, in which are embedded "chromatophores," or cells charged with various colored pigment-granules. By expansion of the cell the pigment is diffused, and by its contraction concentrated, hence the rapid flashes of changing color for which the *Cephalopoda* as a whole are so remarkable.

The head is broad, with a complex cartilage which protects the central nervous system, and the eyes bright green. The front of the head is occupied entirely by the mouth, and the bases of the arms, of which there are 10, 8 having suckers on the extremity in 4 longitudinal rows. The two remaining arms, known as "tentacles," occupy the interspaces between the ventral arms and those next to them. They are twice as long as the others, and can be withdrawn into pockets situated beneath the eyes and carried in this position when not in use. The mouth, situated in the centre of the roots of the arms, is surrounded by a lip with seven prominent angles, which bear small suckers in some species.

On the lower side, between the muscular sac and the body proper which contains the viscera, is a hollow space, the "branchial" or "mantle-cavity," containing the siphon, the intestines, kidneys, genital organs and gills. Respiration is carried on by rhythmic contractions of the mantle, in consequence of which water enters at either side, passes over the gills, and is expelled by the siphon; this takes place about 70 times in a minute. On the dorsal side of the animal, immediately beneath the integument, is a closed sac which contains the cuttle-bone. Speaking generally, this may be said to be of an elongated spoon or boat shape; it consists of a horny lamina. Lying parallel to the terminal portion of the intestine is the "ink-bag," a hollow gland opening near the anus, and furnishing a deep-brown fluid, which is ejected by the animal when alarmed in order to conceal its retreat. The pigment known as "sepia" is prepared from it. The heart is situated posteriorly, and consists of a pear-shaped sac which receives on either side a vein from the gills, dilated just before its termination into a muscular contractile antechamber or auricle.

The nervous system consists of the three pairs of ganglia common to the mollusks, concentrated round the œsophagus.

Of the sense organs the eyes are the most conspicuous. They occupy depressions in the head cartilage.

The ears are a pair of small closed vesicles, embedded in the head-cartilage, and supplied by nerves which, though apparently springing from the pedal ganglia, really have their origin in the cerebral. A ciliated pit, usually considered olfactory, lies behind each eye. The sexes are separate. The testis and ovary are both single and situated in the hinder part of the body; the latter lies in the visceral sac or pericardium above described, the former in an almost closed diverticulum of it. The eggs have a tough capsule, with a projection at one end and a kind of handle at the other by which they are attached in bunches to a twig of seaweed or other similar substance.

Cuttlefish are found in littoral regions or in moderately deep water; ordinarily they rest horizontally on or near the bottom, the fins gently undulating, the tentacles retracted, and the arms depressed. Progression may take place by means of the fins with considerable rapidity in either direction, the funnel being turned so that the stream of water issuing from it assists in propulsion; rapid darts backward when the animal is alarmed are brought about either by the sudden ejection of water through the siphon, or by spreading out and reuniting the arms. See CEPHALOPODA; SQUID.

CUTTY STOOL, the stool of repentance, a seat formerly set apart in Scottish kirks, on which offenders against chastity were exhibited before the congregation and submitted to the minister's rebukes before they were readmitted to church privileges.

CUTTYHUNK, Mass., the most southerly island in Buzzard's Bay. It was on this island that Bartholomew Gosnold landed, on 25 May 1602, and there established the first settlement of white men in that part of the world. He named the island after Queen Elizabeth, calling it Elizabeth Isle. The settlement did not continue a full month before it was abandoned, the colonists returning to England. It is now used chiefly as a place of summer resort. The United States Life-Saving Station was established there in 1889 and the house of the Massachusetts Humane Society in 1847. The site of Gosnold's fort was identified in 1797. The literature of the subject is now considerable. The publication in England of the «journalists» of the voyage helped to pave the way for the later successful plantations of Pilgrims and Puritans. In celebration of the 300th anniversary of the initial settlement of white men in New England, a tower, built of pebbles and cement, with tablet in honor of Gosnold, was reared and dedicated with oratory and song in 1903, the speakers being Charles Francis Adams, Rev. Dr. Leonard, and William Elliot Griffis, whose lecture in Boston on Gosnold, in 1902, suggested the carrying out of the project. Consult *New England Magazine* (Boston 1897).

CUVIER, kü-vē-ā, **Georges Chrétien Léopold Dagobert,** BARON DE, French naturalist and the founder of the science of comparative anatomy: b. Montbéliard, France, 23 Aug. 1769; d. Paris, 13 May 1832. After finishing his education at Stuttgart he accepted the situation of tutor in a Protestant family in Normandy. The Abbé Texier, whom the troubles of the time had driven into exile from the capital, introduced him by letter to Jussieu and Geoffroy Saint-Hilaire. Several memoirs, written about this time, and transmitted to the latter, established his reputation and procured his admission to two or three of the learned societies in Paris. In 1800 he was appointed successor to Daubenton as professor of natural history at the Collège de France, and in 1802 succeeded Mertrud in the chair of comparative anatomy at the Garden of Plants. From that time he devoted himself steadily to the studies which have immortalized his name. Cuvier's 'Lessons in Comparative Anatomy' (1801–05) and the 'Animal Kingdom' (1817), in which the whole animal kingdom is arranged according to the organization of the beings of which it consists, have raised him to the pinnacle of scientific fame, and established him as the first naturalist of his time in the world after Linnæus, the celebrated Swedish botanist. His numerous memoirs and works on these subjects show a master-mind in the study of zoology; and extending the principles laid down in his comparative anatomy to the study of palæontology, he was enabled to render immense service to geology. Starting from the law that there is a correlation of forms in organized beings — that all the parts of each individual have mutual relations with each other, tending to produce one end, that of the existence of the being — that each living being has in its nature its own proper functions, and ought therefore to have forms appropriated for that function; and that consequently the analogous parts of all animals have received modifications of form which enable them to be recognized — he was able to ascertain from the inspection of a single fossil bone, not only the family to which it ought to belong, but the genus to which it must be referred. Even the very species of animal was thus identified, and the restoration of its external form as it might have lived and died became in his hands an object of certainty and precision. His 'Animal Kingdom' has been frequently translated, and forms the basis of all arrangements followed at the present time. Cuvier filled many offices of great importance in the state; particularly those connected with educational institutions. Napoleon treated him with much consideration; Louis XVIII and Charles X advanced him to honor; and Louis Philippe raised him to the rank of a peer of the realm. Consult Candolle, 'Notice sur la vie et les ouvrages de G. Cuvier'; Lee, 'Memoirs of Baron Cuvier' (1833); Lomenie, 'G. Cuvier, par un homme de rien' (1841); Florens, 'Cuvier; Histoire de les travaux' (1845); de Blairville, 'Cuvier et Geoffroy Saint-Hilaire' (1890).

CUVILLIER-FLEURY, kü've-yā' flė'rē', **Alfred Auguste,** French author: b. Paris, 18 March 1802; d. there, 18 Oct. 1887. He was educated in the Collège Louis-le-Grand, became private secretary to Louis Bonaparte, ex-king of Holland, in 1819; tutor to the Duke of Aumale in 1827, and entered the staff of the *Journal des Débats* in 1834. He was made a member of the Academy in 1866. Among his works are 'Voyages et voyageurs' (1854); 'Études, historiques et littéraires' (1854), 'Nouvelles études' (1855); 'Dernières études historiques et littéraires' (1859); 'Historiens, poètes et romanciers' (1863); 'Études et portraits' (1865). Consult the biography by the Duc d'Aumale in 'Le livre du centenaire des débats,' and Bertin's edition (1900) of his 'Journal intime.'

CUXHAVEN, kooks'hä-fĕn, Germany, fortified seaport at the mouth of the river Elbe, in a detached portion of territory belonging to Hamburg. The old harbor is one of the safest on the coast, has been much improved in recent years, and is often resorted to in cases of danger. Many passengers for foreign parts embark at Cuxhaven, which is annually rising to greater importance. Here vessels generally take pilots to go up the river to Hamburg and other places. These pilots are privileged, and by their statutes are compelled always to keep pilot-vessels out at sea, with men ready to conduct any vessel which may demand assistance. It is a free port, being outside the Zollverein, and the Hamburg-American Steamship Company have made it the point of arrival and departure of their mail service. Pop. 14,888.

CUYABA, koo-yä-bä', Brazil, the capital of the state of Matto Grosso, situated on the Cuyabá River, a part of the Paraguay River system. It has broad, well-paved streets and contains barracks, an arsenal and a military hospital. It was founded early in the 18th century by adventurers from São Paulo, in search of gold. The climate being somewhat more healthful than that of other portions of the state, it has retained a moderate degree of prosperity since the mining industry terminated. A military arsenal and barracks are located here. From Rio de Janeiro in a direct line the distance to Cuyabá is about 840 miles, but only one-third of the railroad has been completed which is to connect Cuyabá with the coast, through São Paulo. At the present time transportation is mainly by way of the Paraguay and La Plata rivers to Buenos Aires or Montevideo; thence by the Atlantic to the national capital — a total distance of about 3,720 miles. Pop. 14,507. See MATTO GROSSO.

CUYAHOGA (kē'ă-hō'ga) **FALLS,** Ohio, village of Summit County, on the Baltimore and Ohio and the Cleveland, Akron and Columbus railroads, and the Cuyahoga River, 33 miles southeast of Cleveland. It has a public library, paper-bag works, wire nail factory, machine shops, rubber factory, flour mills, sewer pipe works, etc. The municipality owns the water supply system and the electric-lighting plant. Pop. 4,020.

CUYLER, John, American surgeon: b. Georgia, about 1810; d. Morristown, N. J., 26 April 1884. He entered the army as assistant surgeon in 1834, being among the first to pass the rigid examination instituted in 1833. He was actively engaged in the Creek War of 1838, and the Seminole War of 1840, and served with distinction during the Mexican War, receiving promotion as major and surgeon on 16 Feb. 1847. From 1848 to 1855 he served at West Point. As senior medical officer at Fort Monroe, during the first years of the Civil War, his services were invaluable in organizing the medical department of the armies congregated there. He served afterward as medical inspector and acting medical inspector-general. He served on examining boards, and sought to uphold a high professional standard among army surgeons. He was promoted lieutenant-colonel and medical inspector in 1862, brevetted brigadier-general on 13 March 1865, and promoted colonel in 1876. After the war he was medical director of important departments until his retirement, 30 June 1882.

CUYLER, Theodore Ledyard, American clergyman: b. Aurora, N. Y., 10 Jan. 1822; d. Brooklyn, N. Y., 26 Feb. 1909. He was graduated at Princeton College in 1841 and at Princeton Theological Seminary in 1846. From 1860 to 1890 he was pastor of Lafayette Avenue Presbyterian Church in Brooklyn, resigning to devote his time to literary and reform work. Dr. Cuyler's reputation as a preacher and writer was international. He wrote 'Newly Enlisted'; 'Christianity in the Home'; 'Cedar Christian' (1863); 'The Empty Crib' (1868); 'Heart Life' (1871); 'From the Nile to Norway' (1881); 'Stirring the Eagle's Nest' (1890); 'Beulah Land'; 'Mountain Tops with Jesus'; 'Our Christmas Tides' (1904), etc. Besides his published volumes he wrote some 3,000 articles in magazines, many of these having been reprinted in England. In 1902 he published his 'Recollections of a Long Life.'

CUYO, koo'yō, Philippines, a town and the capital of the province of Paragua, situated on the southwestern coast of the island of Cuyo, Cuyos group. The town is well built, and has an important trade. It is protected by a fort built on a land spit near the town. Pop. 8,500.

CUYOS ISLANDS, Philippines, a group of 47 islands lying south of the island of Mindoro, and east of Palawan; total area, 63 square miles. The most important island of the group is Cuyo, 8 miles long; area, 20 square miles. The islands, with the exception of Cuyo, are infertile, and there is but little manufacture; the chief industries are the gathering and preparation of edible birds' nests and trepang, and the cultivation of rice and coconut oil. By the Civil Government Act of 1902, these islands were made a part of the province of Paragua, Palawan.

CUYP, koip, or **KUYP, Albert,** Dutch artist: b. Dordrecht 1605; d. there 1691. He was a son of Jacob Cuyp (q.v.) and excelled in the painting of cattle, grazing or reposing, moonlights, wintry landscapes, still waters with ships, horse-markets, hunts, camps and cavalry fights, and in rendering effects of warm golden sunlight he is without a rival. During his lifetime and long after, Albert's pictures, though in many respects equal to those of Claude, were held in little estimation. He is best represented in London — the National Gallery, Buckingham Palace, Bridgewater House, Wallace Collection, Dulwich College have specimens of his art, and a fine cattle piece is to be found in the Metropolitan Museum of New York. Consult Würzbach, 'Niederländisches Künstler-Lexikon' (Leipzig 1906), and De Groot, 'Beschreibung und Verzeichniss der Werke holländischer Maler' (ib. 1908).

CUYP, the name of a family of Dutch artists: (1) JACOB GERRITSZ, Dutch painter, commonly called the OLD CUYP; b. Dordrecht 1575; d. 1651. Jacob Cuyp's representation of cows and sheep, battles and encampments, are clever, but his fame rests principally on his excellent portraits which can be found at Berlin, Cologne, Frankfort, Amsterdam, Stockholm and Metz. His coloring is warm and transparent; his manner free and spirited. His portrayals of peasant groups are excellent. He was fond of introducing pet animals into his portraits. In one portrait of a family group, now in the Rothschild collection, an out-of-doors scene is represented with cows grazing here and there. These animals are depicted with the greatest accuracy. Cuyp was one of the four founders of the Guild of Saint Luke at Dordrecht. (2) BENJAMIN GERRITSZ, half-brother of the preceding: b. Dordrecht 1612; d. 1652. In 1631 he became a member of the Guild. He painted historical and mythological scenes, in the Italian manner, with great force, crudity of color, but excellent in design and grouping. Some of his pictures are 'Angels at the Tomb of Christ' (Stockholm); 'Adoration of the Shepherds' (Berlin); 'Episode in the History of Cambyses' (Paris). (3) ALBERT, the nephew of the former and the best known of this family: b. Dordrecht 1620; d. there 1691. He studied with his father and at first imitated him, but later developed a style of his own. In 1658, he married a wealthy widow, Cornelia Bosman, by whom he had one daughter. He sat in the high court of the province of Dordwyck, where he had considerable property, and was even considered as a candidate for the regency of Dordrecht in 1672. It is from this locality that his inspiration comes — every mood of nature is sensitively depicted in his many canvasses; there are clear blue skies, pleasant meadows, quiet restful cows and horses; the people and costumes of the time — handled with sincere appreciation and fine skill in light and shade and perspective, and a homely, pleasant realism. Examples of his animal pictures are to be found at Rotterdam, Amsterdam, Petrograd and Brussels; of his portraits the best are at Buckingham Palace, Bridgewater Gallery, Louvre and Dresden museums. An excellent night picture is the 'Night on the Banks of a River' in the Grosvenor collection. Other well-known works are 'View of Dordrecht'; 'Riders with Boy and Herdsman' (National Gallery); 'Huntsman'; 'Piper with Cows' (Louvre). He painted a few allegorical subjects also, but these do not equal his other works in charm and facility. Consult Würzbach, 'Niederländisches Künstler-Lexikon' (Leipzig 1906) and De Groot, 'Beschreibung und Verzeichniss der Werke holländischer Maler' (ib. 1908). John Smith's 'Catalogue raisonné' enumerates his works (9 vols., 1840).

CUYPERS, Peter, koi'pės, Dutch architect: b. Roermond 1827; d. 1903. He received his education at the Antwerp Academy. Becoming prominent in his chosen field he was commissioned to build the Royal Museum, Amsterdam, to restore the cathedral of Mainz and to construct several important churches. The formost of these are Saint Jacob's, The Hague, Saint Barbara's, Breda, Saint Catharine's, Eindhoven the Sacred Heart, Amsterdam, and Saint Boniface's, Leeuwarden. He wrote 'Der Dom zu Mainz, Baugeschichtliche Skizze' (1878).

CUYUNA RANGE. See IRON ORE DISTRICTS.

CUYUNI, koo-yoo'nē, a river of South America, rises in Venezuela, flows first north, then east, through British Guiana, and into the Mazaruni. It has numerous rapids and falls; the lowest is 30 miles above the mouth. It is navigable for about 500 miles. Among its tributaries is the gold-bearing Yurauri.

CUZCO, kooz'kō, Peru, department in the southeastern part of the republic, bounded by the province of Loreto on the north, by Bolivia on the northeast and east, by Puno and Arequipa on the south, and by Apurimac, Ayacucho, and Junin on the west. Its area is 156,317 square miles. Within its limits are found nearly all varieties of temperature, with the corresponding products. The fertile valleys of the Vilcamayo enjoy an Italian climate; toward the Bolivian frontier there are vast tropical forests, abounding in all the productions of the torrid zone; on the slopes of the Andes are plains covered with pasture or crops of cereals; and still higher up on the table-lands and peaks are large flocks of vicuñas and alpacas. In general, the easterly regions have the characteristics of the upper Amazon country, while the southwest is extremely mountainous, with beautiful and healthful elevated plains or valleys, like that in which the city of Cuzco is situated. Pop. of the department, 438,646.

CUZCO, Peru, the most famous ancient city of South America. Situated in lat. 13° 31' S., and lon. 73° 3' W., Cuzco is at an elevation of 11,380 feet above the sea (compare Mount Washington, 6,288 feet, and Mont Blanc, 15,779 feet), and its climate is temperate; but in winter snow often falls. It was the chief town of the Inca tribe (q.v.). The writings left by Spanish conquerors and early chroniclers, upon which subsequent accounts have been based, not only preserved the Indian myths but also added some fanciful details in regard to the place, the inhabitants and their institutions. According to such myths and accounts, the founder of the city was Manco Capac, son of the sun-god; strong walls, we are told, surrounded it, and in its midst was a great square, from which started four roads binding together the "empire of the four quarters of the world" (in the native tongue, "Tahuantinsuyu"), the first road leading to Puitu, the modern Quito, the second over the Andes, the third to Chile and the fourth to the ocean. The temple of the sun, with the surrounding dwellings for priests and virgins of the sun, occupied a district of the city called "The Golden." Five mighty walls enclosed that sacred place. The temple itself was circular in form. Its chief hall, dedicated to the sun-god, contained an image of the sun made of beaten gold; the door-posts were of gold; all the walls were covered with discs of the same metal; and the mummies of the Incas ranged beside the god were decked out with golden ornaments. A door encased in silver led to a chapel dedicated to the moon-goddess, sister and wife of the sun-god. Here the images and furnishings were of the white metal, and the mummies of the wives of the Incas were decorated with silver. A part of the site of the temple is now occupied by the church of S. Domingo. The Sacsahuaman fortress overlooked the city from a hill 250 metres high. It had a triple wall, built of enormous stones. Through deep ravines on either side of the Sacsahuaman hill flow the little rivers of Huatanay and Rodadero, the former passing beneath the houses on the west side of the square, down through the centre of a broad street, where it is crossed by numerous stone bridges, and eventually uniting with the Rodadero. The main part of the old city was built between these two rivers; and even to-day the houses there commonly show the massive masonry of the Inca architecture in their lower portions, though having a modern superstructure. Now, as formerly, the streets run at right angles. The government established by the Incas, though in form a despotic theocracy, was relatively mild and patriarchal. Nowhere and never have there been chiefs of state so successful in monopolizing all power, all initiative. Accordingly, when the Spanish conqueror Pizarro captured Inca Atahualpa, the people were incapable of effective resistance. Atahualpa's successors were Huascar and Manco. The former was slain; the latter was induced by promises of friendship to lead the Spaniards into Cuzco (15 Nov. 1533). An enormous booty was obtained by despoiling the temples and palaces. Besides gold and silver, the common soldiers received 200 slaves each, and the sacred sun-maidens were treated as a part of the loot. In 1536 the last of the Incas, Manco, besieged the city unsuccessfully. It remained the principal Spanish stronghold for a long time, though Pizarro founded Ciudad de los Reyes (Lima) 6 Jan. 1535. Extremely interesting are the remnants of the fortifications, temple, etc., some of which are constructed of huge masses of rock (one piece 16 feet in height; others 10 and 12 feet) of irregular shape, yet made to fit exactly one into the other with minute accuracy, as in mosaics. Such works, constructed before 1370, are scarcely surpassed by any in the world in respect to their solidity and the skilful workmanship they attest. Among the public buildings are the Cabildo, the university, library and museum, etc. The city has suffered from lack of means of transportation and communication. Only in the last few years has an effort been made to connect it by railroad with the Titicaca region. It is regularly built and contains several handsome buildings, prominent among which are the cathedral, in the Corinthian style, and the convent of San Domingo. There are also hospitals, a university founded in 1692, a national college and a museum. It has shrunken in trade as in population. Gold and silver work, leather, sugar, cotton, linen and wool are produced to a limited extent. The inhabitants at the time of the conquest numbered perhaps 100,000; a century ago about 50,000; at present about 20,000.

CYANAMIDE. See ELECTRO-CHEMICAL INDUSTRIES.

CYANE, The. See CONSTITUTION, THE.

CYANIC ACID is a thin, colorless liquid, stable only below 32° F., having an extremely pungent odor, somewhat resembling acetic acid, and a vapor irritating to the eyes; the liquid acid is blistering to the skin. It was discovered in 1824 by F. Wöhler. Cyanic acid is prepared by heating anhydrous cyanuric acid nearly to redness in a current of carbonic acid gas (CO_2). The resulting vapors of cyanic acid are conducted into a condenser surrounded by a freezing mixture. Cyanic acid dissolves in ice-water without decomposing until a certain degree of concentration is reached. Kept at a temperature of 32° cyanic acid changes rapidly (in the course of an hour) into insoluble cyanuric acid ($C_3N_3O_3H_3$). At a higher temperature the transformation is explosive with the formation of "cyamelide," the exact composition of which is not known, but it seems to be the same as that of cyanuric acid. Cyanic acid unites with alkalis to form cyanates. Prominent among these are potassium cyanate, useful as a reagent; and ammonium cyanate, interesting chiefly because it was the source of the first synthetic production of an organic substance from inorganic materials.

CYANIDE INDUSTRY, The. The products of the cyanide industry reported for 1914 comprise sodium cyanide, yellow prussiate of potash, metallocyanides, yellow prussiate of soda, trisalytes and potassium cyanide. Reports were received from six establishments recently that manufactured cyanides, not including cyanide blues, the total production for the year being 16,450,225 pounds, valued at $2,398,674. This output comprised 3,204,684 pounds of yellow prussiate of potash, valued at $451,092, and 13,245,541 pounds of other cyanides, designated as sodium cyanide, metallocyanides, yellow prussiate of soda, trisalytes and potassium cyanide, valued at $1,947,582, the cyanides being named in the order of their importance in respect to quantity produced. While the production of the yellow prussiate has decreased by about 9 per cent since 1909, the output of other cyanides increased by 35 per cent. Of the six establishments reported in 1914, two were located in New Jersey and one each in Massachusetts, New York, Ohio and Pennsylvania.

In addition, recently, 1,239,382 pounds of cyanide blues (iron ferrocyanides) reported as Prussian blue, valued at $387,077, were returned by 15 establishments engaged primarily in the manufacture of paints and pigments. Of these establishments, six were located in New York, four in New Jersey, four in Illinois and one in Massachusetts.

CYANIDE PRACTICE, a term used to cover generally the diverse applications of the process of securing the precious metals from their ores through the use of potassium cyanide. While the process follows certain basic lines, the applications of it vary almost with every mine in which it has been put into practice. This article can give only the general outline of the process, and the interested reader must be referred to the voluminous mass of periodical literature to be found in the current mining magazines and the books suggested below. It should be noted in passing that cyanidation in the extraction of gold from ores has practically superseded the former processes of smelting, pan-amalgamation, bromination, chlorination and in large measure plate-amalgamation, as the most thorough as well as economical method. In a number of plants, however, cyanidation has been abandoned for the newer method of flotation (q.v.).

The cyanide process is based on the fact that water containing only a very small percentage of potassium cyanide dissolves gold and silver, and that these metals may be recovered from this solution by precipitation with metallic zinc. In the treatment of gold and silver ores by this process the first operation is the crushing of the ore to such a degree of fineness that the cyanide solution may reach every particle of the precious metal present. Until very recently this crushing was done by stamp mills, and this is still the practice at many mines. The crushed material from the stamps was then separated into "slime" (the finer) and "sand" (the coarser). The slime was treated by agitation with the cyanide solution in a stirring apparatus, and the sand in a percolator. In the percolation process a much stronger solution of cyanide was required, and a much longer time was consumed. The approved practice in the more progressive mines at present is to use the stamps only for the coarser crushing and to reduce this crushed material to the utmost fineness by further grinding in a tube-mill with quartz pebbles. It is required in some plants that the powder shall all pass a 150-mesh screen. In many plants a solution of cyanide is fed into the material during the crushing. In this case it is usual to pass the crushed material over amalgamating plates of copper as it comes from the stamps: the mercury on the plates seizes the coarser particles of gold at a considerable saving of time and expense.

In the case of ordinary stamp-milled material the separation of the fine and the coarse is made by water jets playing upward from the bottom of the V-shaped separator box. These jets are not strong enough to prevent the coarse material from sinking to the point of the V, but produce sufficient current to carry away the slime over the top of the box and into the collecting vat. This preparation is preliminary to the processing with cyanide, but without such preparation the cyanide process is only a partial success.

The cyanide process proper consists of three operations: (1) Dissolving the precious metal; (2) precipitating the metal from the solution; (3) smelting the precipitates. In the first operation, if «sand» is to be treated by percolation, the material is filled into a tank and some lime or other alkali is scattered over the top and washed into the mass with water, which is then drained away. Then a «strong» cyanide solution, carrying one-fourth of 1 per cent of potassium cyanide, is run into the tank from the bottom and this is allowed to stand for a sufficient period — varying from 6 to 12 hours, according to the kind of ore and its degree of fineness. This solution is then drawn off and a weaker solution run in: and this is repeated several times, the proportion of cyanide being less each time, down to a proportion of one-tenth of 1 per cent, the last «washing» being with clear water. The entire operation requires from four to eight days.

In the treatment of slime, after it is carried over into the collecting tank it is allowed to settle partially, lime being added, after which it is allowed to settle completely. It is then mechanically agitated with more or less of the cyanide solution, according to the proposed after treatment. In what is known as the «decantation» process about four tons of the cyanide solution are used to one ton of slime. After agitation (in one of a dozen different ways) the slime is left to settle, and then three tons of the clear cyanide solution containing probably three-fourths of the gold and silver present in the slime are decanted. Three tons of new or «barren» cyanide solution are then added and agitated with the slime, which is again settled and again three tons of solution are drawn off. This procedure is repeated until 97 or 98 per cent of the gold and silver has been recovered. The alternative method of extracting the gold-laden solution is the filtration process. There are numerous variations of the filter, the ultimate object sought being to get the last drop possible of the gold-bearing cyanide solution out of the slime. Each type has its advocates, and none seems superior to the others.

Having secured by one means or another the solution containing the precious metals, the next step is precipitation. This is accomplished by passing the liquid upward through a mass of zinc which has been finely divided so as to present a large area of surface. This is secured by reducing the zinc to thin and narrow shavings or threads, or even to dust: the latter, however, has a dangerous tendency to explode. An improved form is known as «atomized zinc,» and this in some cases is mixed with atomized lead, or the zinc is alloyed with lead before atomizing. The double cyanide of gold (or silver) and potassium is apparently decomposed, the zinc taking the place of the precious metals in the combination. These metals in a finely divided condition fall to the bottom of the zinc-box, or adhere lightly to the zinc particles, from which they may be brushed.

This sedimentary deposit from the zinc-box contains, besides the gold and silver, a percentage of zinc, and perhaps also some lead, copper and iron and a variety of insoluble metallic salts. It is treated with weak sulphuric acid, which removes the zinc and several other impurities. Or the precipitate may be roasted in a reverbatory furnace. In some plants both the roasting and the sulphuric acid treatment are applied. It is then mixed with a flux and smelted in a graphite crucible, preferably lined with clay. In some plants an oxidizer such as fluorspar or manganese dioxide is also added. When the smelting is complete the metal is cast as bullion — generally from 900 to 950 parts fine. The slag consists principally of silicate of zinc, and frequently contains enough gold to pay for working it over. See GOLD MINING.

The cyanide process was first employed on a commercial scale in 1889 at the Crown Mines at Karangahake, New Zealand. In that year the world's consumption of cyanide amounted to about 50 tons. By 1905 the mining industry was consuming 10,000 tons annually. Previous to the outbreak of the war in Europe the larger part of the world's supply of cyanide was produced in Germany. The complete elimination of this source threw a large burden upon American manufacturers of cyanides, but the demand has been met, the principal raw material used being the refuse beet pulp of the beet sugar industry.

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CYANIDE PROCESS. See GOLD MINING.

CYANIDES. See HYDROCYANIC ACID.

CYANIN, sī'ạ-nĭn, or **ANTHOCYANINE,** the blue coloring-matter of certain flowers, as the violet and corn-flower. It is red in the presence of acids. It occurs in buds and other parts exposed to the light and has been considered a protection against injurious rays of light.

CYANITE, a native aluminum silicate, Al_2SiO_5, identical in composition with sillimanite and andalusite but very different in its physical properties. Its hardness varies on different faces from 4 to 7. Its specific gravity is 3.56 to 3.67. It is triclinic, the crystals usually being long-bladed, transparent or translucent, and of a beautiful sky-blue color in the centre. Stout crystals of grass-green color occur in North Carolina. The finest specimens come from Faido, Switzerland, occurring in paragonite schist. Cyanite abounds throughout the New England and Middle Atlantic States.

CYANOGEN, sī-ăn'ō-jĕn, a colorless, poisonous gas which liquefies at —4° F. and at

—30° F. becomes crystalline. It burns with a peach-blossom-colored flame, forming CO_2 and nitrogen; water dissolves four volumes and alcohol 23 volumes of the gas. It is very poisonous and smells like prussic acid. It polymerizes when heated. Cyanogen gas passed into strong aqueous hydrochloric acid is converted into oxamide. Hydrogen converts cyanogen into hydrocyanic acid, HCN. A solution of cyanogen in water turns dark and deposits azulmic acid, $C_4H_5N_5O$, and the solution contains hydrocyanic acid, urea and oxalate and formate of ammonia. Cyanogen dissolves in an aqueous solution of potash, forming cyanide and isocyanate of potassium. It may be regarded as the nitril of oxalic acid. Dry ammonia gas and cyanogen combine, forming hydrazulmin, $C_4N_6H_6$. Small quantities of cyanogen are formed during the distillation of coal. It can also be made by heating metallic cyanides or $C_2O_2(NH_2)_2$, or by the passing of induction sparks between carbon poles in an atmosphere of nitrogen.

CYANOMETER, sī-ą-nŏm′ę-tėr («measurer of blue»), the name of an instrument invented by Saussure for ascertaining the intensity of color in the sky. It consists of a circular piece of metal of pasteboard, with a band, divided by radii into 51 portions, each of which is painted with a shade of blue, beginning with the deepest, not distinguishable from black, and decreasing gradually to the lightest, not distinguishable from white. It is used in the open air, and the observer holding it up between himself and that part of the air whose color he wishes to ascertain, and in such a position as to secure its being strongly illuminated without receiving the direct rays of the sun, turns it gradually round on its own plane till he perceives an exact similarity between the tint of the instrument and the tint of the sky. The number of that particular tint as marked on the instrument marks the intensity of color in the sky at that particular period.

CYANOPHYCEÆ, sī″an-ō-fī′sē-ē (Gr. «dark blue»), the lowest group (blue-green) of Algæ (q.v.). They are closely allied to the Bacteria (q.v.), and together with them are known as Schizophytes. They do not appear to possess a nucleus. Their color is caused by the diffusion of phycocyan, a blue pigment, throughout their cell-contents. In this group no sexual reproduction has been observed, the only reproductive means known to exist in it consisting of spores and hormogonia of a non-sexual character.

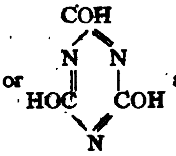
They may be either one-celled, filamentous, or of the nature of loose aggregates of cellsin, a gelatinous matrix. *Oscillatoria* is one of the unbranded filamentous forms. Some of the filamentous forms contain cells known as heterocysts, which lose their protoplasmic contents and become fixed to the sheath of the filament. The growth of the remaining cells forces the filament out of its sheath and produces what is known as false branching. Vegetative reproduction may take place by the breaking off of a part of a filament. Nostoc forms balls of jelly containing twisted filaments.

The blue-green algæ may grow on moist spots on the pond, salt marshes or even in springs the temperature of which is near the boiling point, but their favorite situation is shallow, warm, fresh water, as in lakes, or even reservoirs, where they often cause a disgusting stench in warm weather. Copper sulphate is the best treatment. The Red Sea receives its color from one of the Cyanophyceæ. Consult Cooke, 'British Fresh Water Algæ' (London 1881–83); id., 'Introduction to Fresh-Water Algæ' (ib. 1902); Wolle, 'Fresh-Water Algæ of the United States' (Bethlehem, Pa., 1887).

CYANOSE, sī′ą-nōs, or **CHALCANTHITE**, kăl-kăn′thīt, native sulphate of copper ($CuSO_4$, $5H_2O$), met with generally in stalactitic or reniform masses, but sometimes in well-defined crystals. It is dark-blue, translucent, vitreous, brittle, readily soluble in water and with a most disagreeable metallic taste. Its hardness is 2.5, its specific weight 2.2–2.3. It has a conchoidal fracture. It is found in Chile, Cornwall and elsewhere. It crystallizes in the monoclinic series.

CYANOSIS, sī-ą-nō′sĭs, a condition of diminished oxidation in the blood, causing lividity of the skin, blueness of the lips and symptoms of weakness and fainting. It may be a permanent affection, such as is seen in blue babies, in whom the venous blood obtains access to the arteries without passing through the lungs to be oxidized; or it may be a temporary condition due to choking, to excessive coughing as in false croup or in true diphtheria. It also results as a temporary condition in poisoning by means of a number of the newer drugs used for headaches and vague pains, such as acetanilid and the like. It may also result from coal-gas poisoning and a large variety of other forms of poisoning. Removal of the source, if possible, fresh air, oxygen, artificial respiration, are useful in the treatment of the condition. The congenital varieties are unmodifiable.

CYANOTRICHITE. See LETTSOMITE.

CYANURIC ACID (from «cyanogen» and «uric»), an organic acid having the formula $C_3N_3O_3H_3$ or  and obtained by the dry distillation of uric acid. It is a polymer of cyanic acid, CNOH, and may be obtained, along with another polymer of unknown molecular weight called cyamelide, by the spontaneous polymerization of cyanic acid. To obtain it in this way, potassium cyanide, CNOK, is treated with hydrochloric acid in the presence of ether and water, the mixture being well shaken. Potassium chloride and cyanic acid are formed, the latter polymerizing at once into the two compounds mentioned above, the cyanuric acid that is formed being taken up by the ether, from which it may afterward be recovered by evaporation. Cyanuric acid forms colorless efflorescent crystals which contain two molecules of water when deposited from solution in water. The hydrous crystals have the form of rhombic prisms; but anhydrous crystals, octahedral in form, are also known. Cyanuric acid dissolves in hot nitric, hydrochloric or sulphuric acid, there being no decomposition unless the action is prolonged. When heated it becomes converted into cyanic acid, this reaction being one of the tests that are employed for its detection.

CYATHEA, a genus of arborescent ferns, family *Cyatheaceæ,* characterized by having the spores, which are borne on the back of the frond, enclosed in a cup-shaped indusium. There are many species scattered over the tropical regions of the world. *C. medullaris* is a fine New Zealand species of comparatively hardy character. The soft, pulpy, medullary substance in the centre of the trunk is an article of food somewhat resembling sago. This species and *C. dealbata,* from the same country, are cultivated as ornamental plants. *C. arborea* is a West Indian species.

CYATHOMETER, an apparatus for determining the level and volume of liquids in closed vessels. It is adapted to bottles and to stationary or movable vessels and is designed especially to prevent fraud in the retail trade in valuable liquids.

CYBELE, sĭb'ĕ-lē, a goddess of Asia Minor, like Isis, the symbol of the moon, and what is nearly connected with this, of the fruitfulness of the earth, for which reason she is confounded with Rhea, whose worship originated in Crete, and in whom personified nature was revered. According to Diodorus, Cybele was the daughter of the Phrygian king Mæon and his wife, Dindyma. At her birth her father, vexed that the child was not a boy, exposed her upon Mount Cybelus, where she was nursed by lions and panthers and afterward found and brought up by the wives of the herdsmen. She invented fifes and drums, with which she cured the diseases of beasts and children, became intimate with Marsyas and fell violently in love with Attis. She was afterward recognized and received by her parents. Her father discovering her love for Attis had him seized and executed, and left his body unburied. The grief of Cybele on this occasion deranged her understanding and she began a long search for Attis. In art her original statue was nothing but a dark quadrangular stone. Afterward she was represented as a matron, with a mural crown on her head in reference to the improved condition of men arising from agriculture and their union into cities. A common attribute of the goddess is the veil about her head, which refers to the mysterious and incomprehensible in nature. In her right hand she often holds a staff, as an emblem of her power, and in her left a Phrygian drum. Sometimes a few ears of corn stand near her. The sun also is sometimes represented in her right hand, and the crescent of the moon in her left. We sometimes see her in a chariot drawn by lions; or else she sits upon a lion, and, as omnipotent nature, she holds a thunderbolt; or a lion lies near her. These symbols are all representations of her dominion and of the introduction of civilization by her means in the period of barbarism. Her cult was centralized at Phrygia, whence it found its way into Greece, as early as the latter half of the 6th century B.C., and was introduced at Rome in 204 B.C. To the Romans she was known as the Great Idæan Mother of the Gods. Under the Roman empire, it became one of the three most important Roman cults and was of the last pagan worships to give way before Christianity. Consult Farnell, 'Cults of the Greek States' (Vol. III, Oxford 1907).

CYCADACEÆ. See CYCADALES.

CYCADALES, sĭk-ạ-dā'lēz (from *Cycas* = Neo Lat. nom. pl. of Gr. κύκας; the original name of the African cocoa-palm), a greater group of tropic to sub-tropic naked-seeded or gymnospermous plants, the cycads. The large pith of the thick palm-like trunk of certain species of the genus *Cycas* is the source of the sago starch of commerce, whence the common name, "sago palm." The existing forms are only an ornate remnant of an ancient and varied alliance, the nearest living relative being the "Ginkgo," or maidenhair tree.

At least two distinct Cycadalean types are recognizable; the cycads proper include all extant forms and have only a short fossil record, while the cycadeoids, now wholly extinct, were cosmopolitan throughout all of Mesozoic time. The first group is comprised within the order Cycadaceæ, to which all cycadaceous types were until recent years supposed to belong. The second group may be arbitrarily brought within the order *Bennettitaceæ,* with far the broader relationships and an immensely varied history. But it appears that variants of both groups go back to the Carboniferous.

I. **Cycadaceæ.**—The cycads are a primitive megaphyllous and composite type with wood structure like conifers (and *Cordaites*), certain frond and other characters of ferns, and the outward habit of palms. As in the latter, the stem elongates by the slow growth of a terminal bud, with the unfolding of successive crowns of leaves or fronds spirally arranged in close order. As the leaves wilt down, there is formed from their bases an outer more or less persistent armor, which gives the stem its very characteristic appearance. For trunk-forming plants, the cycads are mostly small or even pygmic. They include tuberous to columnar sparse-branched forms, and vary in size from underground trunks a few centimeters in diameter, with fronds no more than a decimeter long, to moderately tall forest forms.

It was once suggested that *Cycas* (see Fig. 2), in which the so-called carpellary leaves alternate with the foliage leaves in armor formation, grew taller than forms bearing cones only. But such is not the fact. The Australian *Macrozamia Hopei* reaches a height of 60 feet, or nearly double that of any *Cycas,* and the Mexican *Dion spinulosum* is nearly as tall. Both these are columnar, rather than branched types. The most robust trunks may reach a meter in diameter, and the longest fronds a length of four meters. Several Central American and Peruvian species are epiphytic. Most of the cycads branch one or more times after reaching a certain age, and all are handsome and easily grown greenhouse plants. The Japanese gardeners display examples of their native species *Cycas revoluta,* upward of 300 years old, and as freely branched as screw pines. A pot-type is shown in Fig. 3. One of the most interesting of all species is the Cuban *Microcycas calocoma,* a slender stemmed forest form about 30 feet high, also branched in a manner recalling the habitus of the screw pines. The cycads are widely dispersed in tropical and subtropical regions, though seldom abundant. *Zamia floridana* (Fig. 1) locally known as the "coontie," occurs in thickly set clumps as underbrush in the open pine woods of south Florida, while *Z. pumila* is found more sparsely among the denser forest growths of the hammocks.

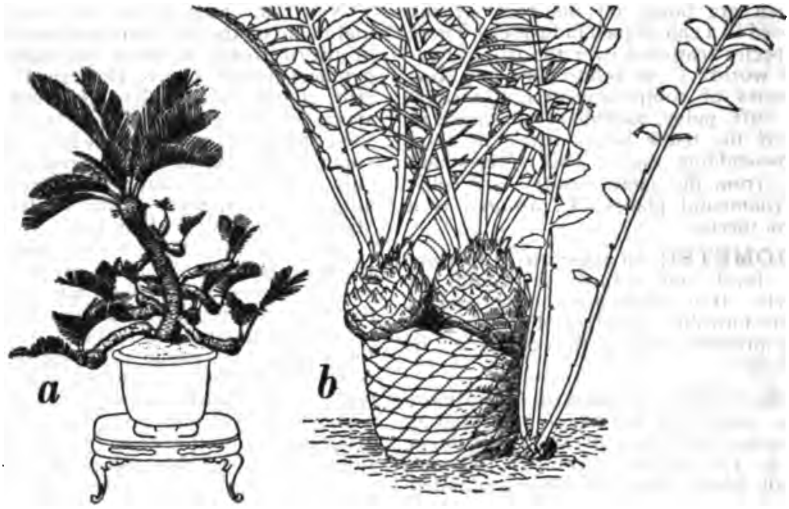


FIG. 3.— Branching in Cycads. (*a*), *Cycas revoluta*, pot-trained in Japan; (*b*), *Encephalartos*, green-house branching.

The fern-like and subterranean stemmed *Stangeria paradoxa* is abundant both in the open grassy veldt and in the bush of Zululand. Similarly the low-growing *Macrozamia spiralis* and *Bowenia serrulata* together form a moderately close undergrowth in the *Eucalyptus* bush of southeastern Australia. Along the eastern mountain slopes of the Mexican state of Vera Cruz, the tall *Dion spinulosum* is in places the only large plant and may be said to form a cycad forest. But as a rule, the cycads now play a rather inconspicuous rôle in forest facies. (See *Geographic Distribution*). The *stem* consists finally in a thin zone of wood, cambium and bast, enclosing a large medulla and enveloped by a thick cortex, this being in the main the arrangement in all the gymnosperms and the dicotyls. But there is this difference; the cortex supports primarily the primitive outer investiture or armor of old foliar bases, which is quite persistent in some forms, but in others is more or less rapidly excised by the formation of successive layers of periderm, at first arising within the leaf-bases, and then in the cortex itself with the casting off of thin bark. Moreover, in *Cycas*, *Macrozamia* and *Encephalartos* the woody cylinder does not as in the other genera remain single. After a time the primary cambium becomes inactive, and there successively arise in the cortex secondary cambiums of diminishing power and regularity. From these are produced the so-called "anomalous wood zones," rarely increasing to a dozen and finding no parallel amongst modern plants. The principal features of this second or polyxylic trunk type are shown in Fig. 2, together with a medullar system of anastomosing cauline bundles. These also occur in the pith of *Encephalartos*. Both pith and cortex are traversed by anastomosing mucilage canals. The cortical bundle system is a complex one, varying greatly in the several genera, and including "girdle leaf traces" (cf. g, Fig. 5) of a primitive, partly concentric structure. The leaf traces are always double and the two branches may nearly girdle the stem. They are most nearly direct in their course from the woody cylinder through the cortex to the leaf base in *Zamia* and *Stangeria*. Complexity of the leaf traces begins even in the cotyledonary plate, but is partly a result of the thickness of cortex.

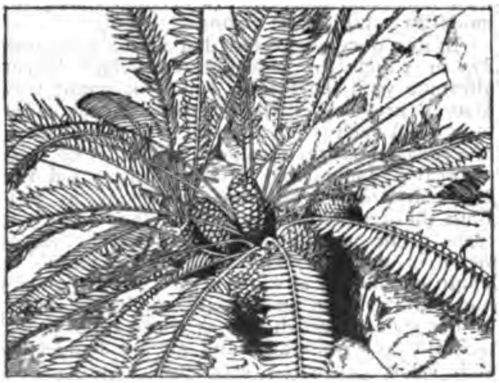


FIG. 4.— *Encephalartos*, growing in rocky clefts, Lado near Uganda border.— Globular branched trunk type recalling the cycadeoids. Note the two large seed cones.

The cycads, unlike all vascular cryptogams, send down a primary root which continues as a tap-root. In the case of such subterranean trunks as those of certain species of *Zamia* (Fig. 1), the tap-root remains prominent, and its lateral branches are relatively small, the trunk assuming a carrot-like form. But in most genera the root system comes to be quite filamentous, being largely made up of freely branching adventitious roots. In *Cycas* the rootlets come to the surface as a felt-like mass and bear numerous coraloid tubercles, recalling the nitrogen fixing tubercles of legumes. The *leaves* or fronds are usually of two kinds, scale

CYCADALES

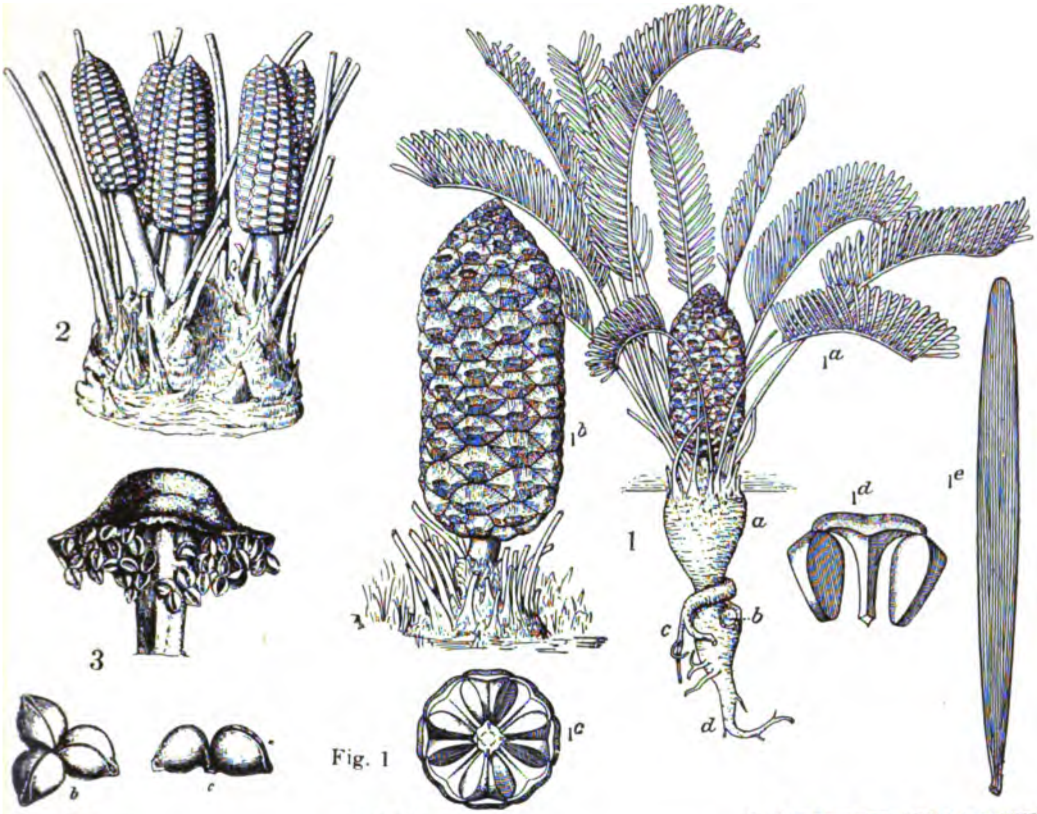


Fig. 1

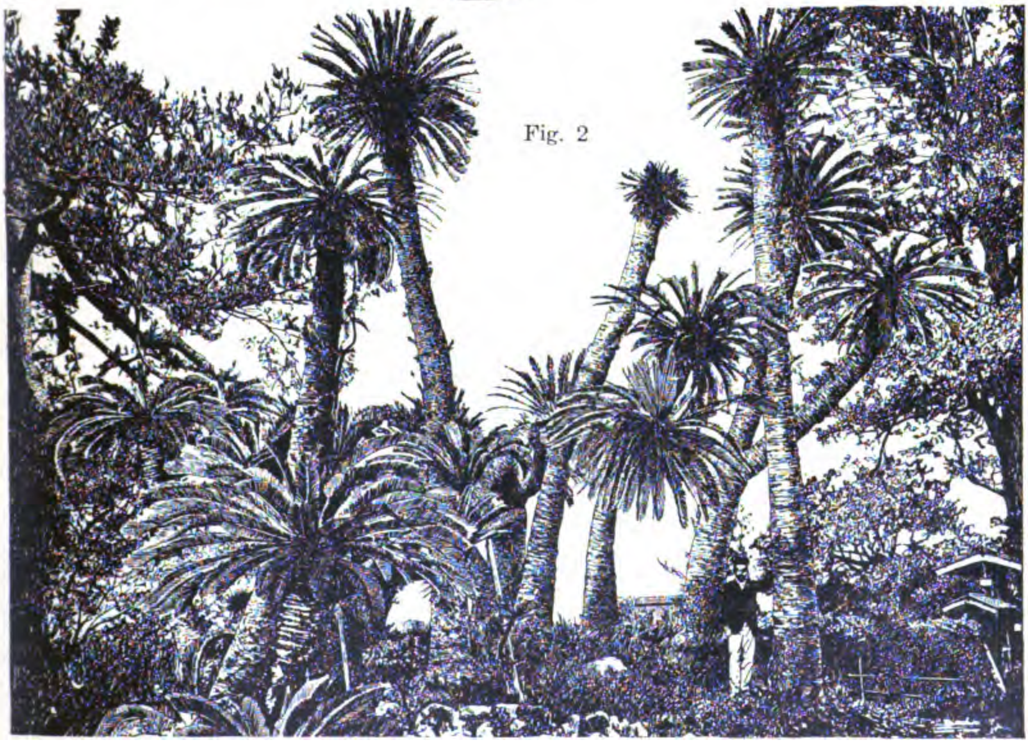
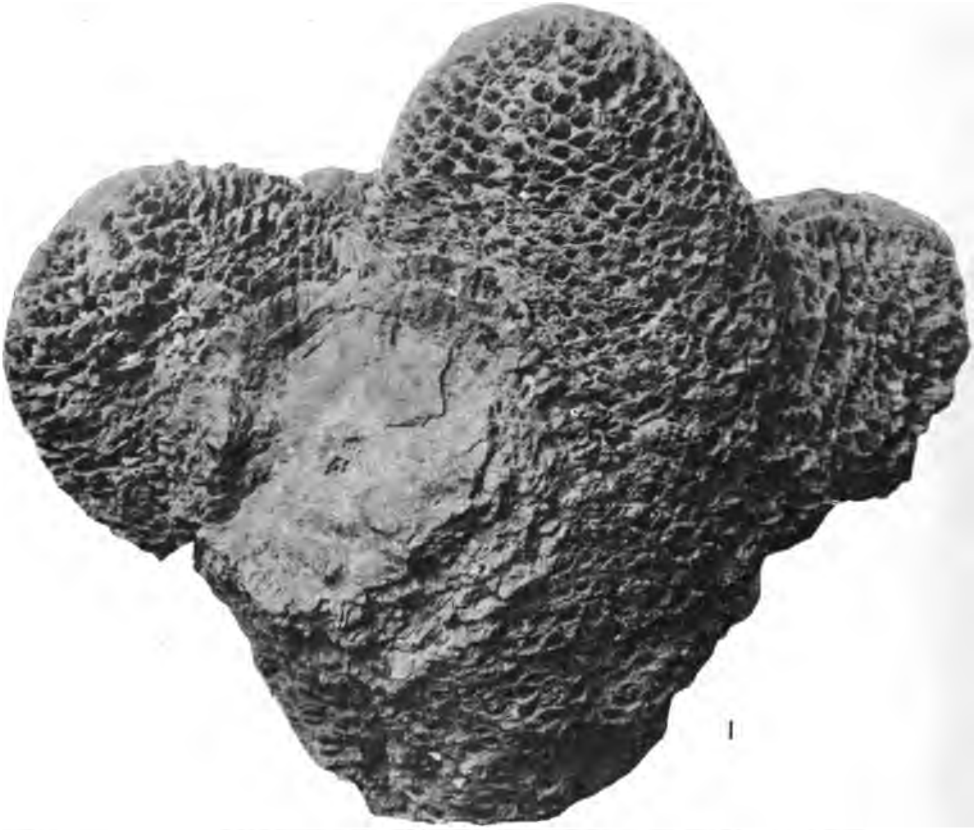


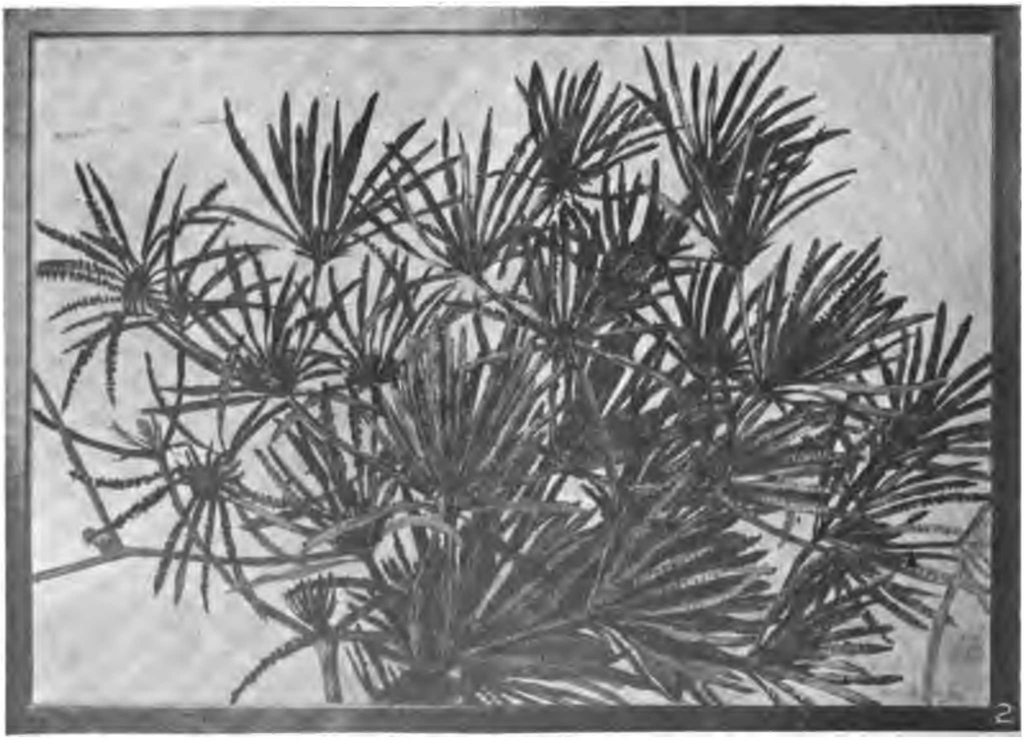
Fig. 2

Fig. 1. *Zamia floridana*, Miami, Florida, middle of November. (1, to right) ovulate plant with enlarged view of cone, section of the same showing seeds, megasporophyll bearing two seeds, and pinnule; (2) summit of staminate plant bearing five cones; (3) microsporophyll with enlarged view of triple group forming sorus. The entire plant is shown about one-tenth natural size. The staminate plant is about one-third

Fig. 2. *Cycas revoluta*, both columnar and branched stems. Ryûgeji Temple garden, near Fjiri, Japan

CYCADALES





EXTREME TYPES OF CYCADEOIDS

1 A Petrified *Cycadeoidea* from the Black Hills, weight over 300 pounds
2 Restoration of Climbing or Procumbent, Flowering *Wielandiella* from the Rhaet of Skone, by Nathorst. Both figures are about one-sixth natural size

and foliage. There are also the fertile or carpellary leaves of *Cycas*. All appear in terminal rosettes in the order named, scale, foliage, and when present, carpellary leaves. The scale leaves are dry and aborted foliage leaves, and are present in all but certain species of *Macrozamia*. The elliptical to acuminate foliage leaves are bipinnate in *Bowenia*, and pinnate in all the other genera. Prefoliation is direct in *Dion* and *Macrozamia*. In *Cycas* the rachis is straight, but the pinnules are circinnately rolled like those of ferns. Conversely in several other genera the pinnules lie straight along the once deflected rachis. The pinnules vary from broad forms of papery thinness in some Zamias to leathery and hard spinose types like *Encephalartos*. They vary much in size and form and are of dichotomous venation, except in *Cycas*, which has a single mid-vein. Those of *Stangeria* are very fern-like, and *Cycas Micholitzii* is bilobately dichotomous, signally recalling the fossil Ginkgoid leaves, especially of the Rhätic. The anatomical structure is much as in certain conifers and the extinct *Cordaites*.

Fructification.— The living cycads are all diœcious. The microsporophylls are always organized into cones which may vary from a few centimeters long to enormous forms exceeding in size the very largest ears of Indian corn, and bearing as many as 600 microsporophylls, these being the most massive to be seen in seed plants. In number the staminate cones vary from a few, or even a single subterminal cone, to over 100 laterally borne cones in the Australian *Macrozamia Moorei*. The sporangia are borne on the under side of the sporophyll and are structurally much like those of *Angiopteris* among the *Marattiaceæ*. In certain genera there is an obscure grouping into sori. (See Fig. 1). The ovules, which are the largest known in the vegetable kingdom, are in the genus *Cycas*, doubtless the most primitive type among recent phanerogams, borne on the margins of modified leaves, emergent in regular series like the ordinary foliage leaves. In the other genera the megasporophylls each bear but a single pair of ovules, and are organized into terminal, subterminal or lateral cones. These are of striking size in all the genera, and reach a length of nearly a meter with a weight of 90 pounds in some Australian Macrozamias. In various forms following development of a single cone, the stem is prolonged from a new lateral bud as a sympode. But cones truly lateral occur in both *Macrozamia* and *Bowenia*, often in some number. The seeds are often of large size. In *Cycas*, especially, the free seeds look much like large plums; but in cone-bearing forms there are strong appression faces. The seed coat is amphivascular — that is, with a midstone separating an inner and outer bundle system. *Cycas* is platyspermic, and the other genera have radio-symmetric seeds. There are from one to three cotyledons. Testal structures are closely analogous to those of *Ginkgo* and the *Cordaitales*. Even stronger is the resemblance to the seeds of the Paleozoic quasi-ferns, or *Cycadofilices*, if, as seems necessary, the apical testal division seen in these ancient seeds is regarded as primitive. The seeds of cycads, like those of *Ginkgo*, are edible. They even form for a considerable part of the year the main food of some of the native Australians — although it is said that as freshly gathered the seeds contain a poisonous principle. This is removed by maceration and drying.

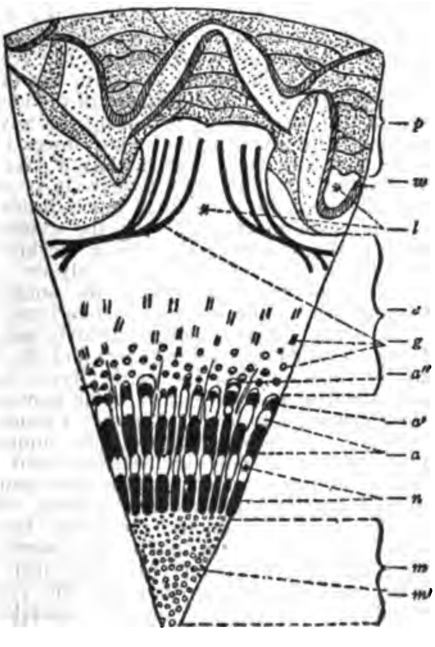


FIG. 5.— *Macrosamia Fraseri*. . Transverse section of trunk × ½. (From Worsdell). *p*, periderm in successively formed layers; *w*, wall of one of the leaf bases; *l*, leaf base; *c*, cortex; *g*, girdle leaf traces; *a''*, isolated bundle of a 3d anomalous wood zone; *a'*, 2d anomalous wood zone; *a*, 1st anomalous wood zone; *n*, normal wood (xylem dark, phloem light); *m*, medulla; *m'*, medullary bundle.

Fecundation.— Among the various primitive characters of the cycads going to prove their descent from homosporous tree-ferns, easily the most recondite is the occurrence of motile multiciliate male cells of the coiled type, characteristic of all the Pteridophytes except the club mosses. These spermatozoids were doubtless common to all the cycadales and are present in *Ginkgo*, but are not known in any other phanerogams. The pollen grains are first drawn through the micropylar tube into the pollen chamber (by suction), after which the pollen tube ruptures the exine and enters the nucellar tissue, where it may branch. Meanwhile the spermatozoids (Figs. 6, 7) form from the generative cells and, after the rupture of the pollen tube, swim actively to the archegonium through a liquid medium, afforded in part by the tube and probably also by extrusion from the egg-cell. The mature spermatozoids are the largest known in any plant (or animal), at least in *Zamia floridana*. In this species they are visible to the naked eye, and have been studied alive in sugar solutions. They are of nearly spherical top-shape, with a ciliferous spiral running from the apex to the middle region, and motion is mainly by means of their cilia, but there is also amœboid motion of the spiral end (see Figs. 6 and 7). From this most primitive form of fecundation known in flowering plants it seems evident that not until the later stages of plant evolution did the pollen tube begin to serve as a direct means of transfer of the male cells as in other phanerogams.

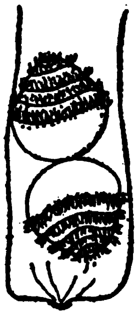


Fig. 6.—*Zamia floridana* DC. End of mature pollen tube after formation of the cilia of the two spermatozoids and just before these pull apart to swim free to the archegonia. × 50. (From Webber).

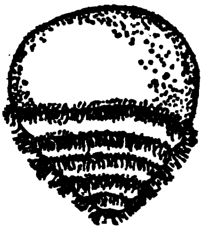


Fig. 7.—*Zamia floridana* DC. Mature spermatozoid while swimming free. × 100. (From Webber).

Classification and Geographic Distribution.—The living cycads include a few over 100 species divided into two families, the *Cycadeæ*, with the single genus *Cycas*, and the *Zamiæ*, including the other genera. The species are nearly equally divided between the New and Old World thermal tropics. There are four indigenous Occidental genera: *Zamia*, with nearly 40 species, ranges over the mainland from Florida, where two species occur, to Brazil, and also over the West Indies; *Ceratozamia*, with six species, and *Dion*, with three, are mainly Mexican and Central American; while the monotypic *Microcycas* is Cuban. In the Orient five genera occur: *Cycas*, with over 20 species, is the most notable, and ranges over Australia, the East Indies and Japan; *Macrozamia*, with 12 species, and the monotypic *Bowenia* are both strictly Australasian; while *Encephalartos*, with 20 species, and the monotypic *Stangeria* are African. This represents a peculiarly balanced distribution. No genus is common to both the Orient and Occident. Mexico, Africa and Australia are the main centres of present day cycads; and while *Cycas* is the only eastern form extending into the northern, *Zamia* is the only western form known to extend into the southern hemisphere. There is, however, no reason to believe the species are now undergoing restriction. The eastern Andine base is the portion of the cycad habitat least known.

Fossil Cycadaceæ.—As in the case of various unique types in the existing flora, the present isolation of the cycads is connected with a past history of great extent. The living forms are only two lateral branches of a varied cycadalean group. The Cycadeæ are ancient, characteristic leaves of the *Cycas* type having already been present in the Carboniferous limestone. Undoubted petrified *Cycas* seeds occur in the Cretaceous of Vancouver Island. The Zamiæ were already present in the Jurassic. But they are always scantily present. Modern looking cycads appear to occur as certainly as anywhere in the upper Cretaceous (Atane Beds) of Greenland. Since Cretaceous time the northern limit of the Cycads has slowly retreated from the Arctic area to its present position. A species recalling the African *Encephalartos* was left behind in the lower Miocene of southern Europe. However, none of the fossil forms referable to the cycads have the importance attaching to the wholly extinct cycadeoid group, the Bennettitaceæ. Nearly all the abundant vegetation of the Mesozoic, formerly supposed to fall within the Cycads, is being gradually relegated to this group, and to an account of its discovery and features we now turn.

II. Bennettitaceæ.—The record of the discovery and segregation of this extinct group from the cycads proper now forms one of the most interesting chapters of palæontologic research. The cycad, or more exactly speaking, the cycadophytan type of foliage, characterizes the vegetation of mid-geologic time. Of all fossil plants yielded by the Mesozoic rocks, over 30 per cent are cycadalean. So universally and in such variety of species do the leaf imprints occur that the Mesozoic is often spoken of as the «age of cycads.» But the actual proportion of cycad and cycad-like plants in the Mesozoic floras can only be surmised. The recovered record consists largely in xerophyllous, lowland or swamp types, and it has not yet been ascertained whether there was a distinct cycadeous element in the contemporaneous upland and plateau vegetation; although it is probable that there was, and there is evidence that both cycads and cycadeoids were notable constituents in the Mesozoic vegetation of the Arctic areas. Probably the species ran into the thousands. At any rate, the dominance of cycadeous plants in the fossil floras preceding the advent of recognizable angiosperms in the lower Cretaceous has long been regarded as a fact of deep evolutionary interest; though it is only within the past 25 years that much headway has been made in the study of the extensive fossil material at hand. Previously the knowledge of the fossil cycads rested mainly on such facts as could be gleaned from the study of dissociated leaves and occasional stem imprints. The few petrified forms more accurately studied had not resulted in *restorations*, and it was naturally supposed that the extinct types were closely allied to modern forms. The names of the leaf genera, *Zamites*, *Otozamites*, *Cycadites*, *Stangerites*, etc., etc., indicate this supposed affinity. But it is now known that even the xerophyllous types, which are the more readily conserved because of form and habitat, often bore, despite their strictly cycad-like leaves, flowers and fruits very unlike the cones of existing cycads. (See Fig. 8). American researches have mainly contributed to this result. Especially the discovery of the remarkable silicified trunks of the Black Hills of South Dakota has given to the cycadeoids a transcendent interest from both the palæontologic and the botanic viewpoint. These trunks are not, however, unique to North America. They belong mainly to the genus *Cycadeoidea* and the family Cycadeoideæ, established nearly a century since by the English geologist Buckland. Various silicified stems with a heavy armor of leaf bases notably simulating the recent cycads just described had been encountered in the so-called «dirt bed» of the oölite formation of the Isle of Portland. This lies just above the limestone there quarried. As the black earth of the «dirt bed» is stripped away, the cycadeoids, with more or less crushed terminal buds, are encountered quite in the original soil in which they grew. The stems are still being found and have been known to the quarrymen as «crow's nests» for several centuries, going back even to the time when the materials for the construction of Saint Paul's of London were quarried. Owing partly to the checked type of conservation, the Buckland specimens received little further study, and it was not until 50 years later that William Carruthers described an Isle of Wight trunk bearing ovulate cones.

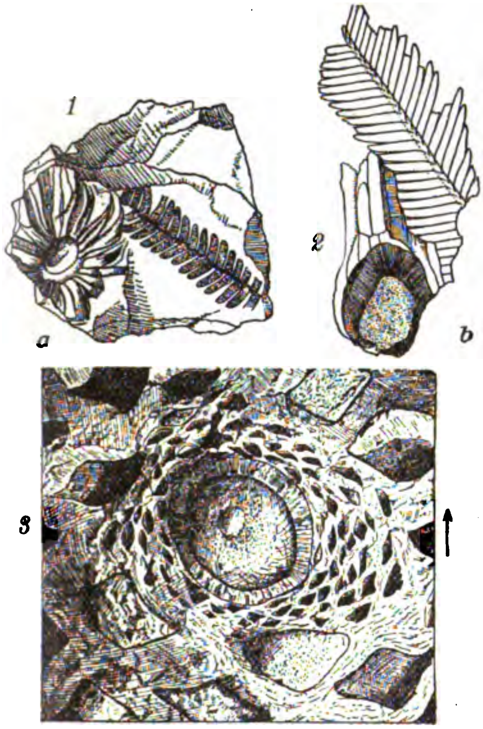


FIG. 8.— Types of Cycadeoid fossilization. Above (1, 2), imprints of associated fronds and fruits, from the Gondwanas, India. Below (3), surface of petrified Black Hills trunk showing similar ovulate cone. Cf. FIG. 10.

Certain Italian specimens had yielded incomplete results, and a splendid Galician trunk in the Zwinger Museum at Dresden, discovered as early as 1753, remained unstudied. Neither did an interesting series of American trunks from the «iron ore» beds of Maryland, first noted about 1860, receive merited attention. In fact, the ovulate cone being the most aberrant cycadeoid feature, with the foliage uncertain, the relationship to the cycad-leafed plants of the Mesozoic was obscured rather than cleared; and so the subject rested until the attention of American palæontologists was directed to the Black Hills of South Dakota and a little later to the Freeze Out Hills of Wyoming. Beginning with the species *Cycadeoidea dacotensis* (Macbride 1893) nearly a score of valid species have been described from silicified types, often bearing conserved crowns of young leaves and the flower buds in various stages of growth. In one instance, that of the monocarpic *Cycadeoidea Dartoni*, perhaps the most remarkable fossil plant ever recovered, fully 500 of the mature ovulate cones are embedded in the armor. Over half are complete and show the seeds with the finely conserved dicotyledonous embryos. For a full account consult references, Wieland, 'American Fossil Cycads' (Vol. II). About the lower Cretaceous Black Hills rim and in the Freeze Out Hills upwards of 1,000 of the silicified cycadeoid trunks have been secured. These are now mainly included in the collections of the State University of Iowa, Yale University and the United States National Museum. The Yale collection includes a unique series of branched trunks and is unrivalled in extent and the variety of types included. These specimens have permitted the preparation of a unique series of polished surfaces and thin sections from which alone critical study is possible. These great accessions of new material have made possible a redintegration of the actual plant type represented by the genus *Cycadeoidea,* now probably the best known of all extinct plants. Obviously *Cycadeoidea* itself is a highly specialized form; but aside from its striking features it possesses an extreme interest as affording the indispensable structural key to the study of the cycadeoid casts and imprints. Moreover, the wider knowledge of this previously unknown group of plants for the first time brings within the range of scientific discussion the origin of the angiosperms. Curiously enough while some of the trunks of *Cycadeoidea* weigh nearly 1,000 pounds, certain related forms like the *Wielandiella* of Nathorst had much branched stems little thicker than a lead pencil. (See plate). In brief, these dissimilar but related forms together with the principal extinct cycadaceous plants are the *cycadeoids,* classified as the Bennettitaceæ. It is next in order to consider *Cycadeoidea* as the key to the group.

Organization of Cycadeoidea.— In the Mesozoic forests in which they grow, the mature trunks of *Cycadeoidea,* with their foliage, would have appeared to a beholder to differ little from modern cycads. Some of the low branched Dakotan trunks must have greatly resembled the Uganda *Encephalartos* of Fig. 4. Only when in full fruit would essential differences have appeared to the eye. Vegetatively, the more copious fern-like chaff or ramentum borne by the leaf bases forms the chief outer peculiarity. As in the cycad trunk, the divergence from other gymnosperms is mainly due to the retention of the old leaf bases, the heavy underlying cortical parenchyma and the presence of a relatively enormous medulla or pith. The woody cylinder is thus relatively reduced; it is also of somewhat simple structure and usually without growth rings. There is, however, a tendency to the formation of growth rings in some of the silicified trunks, with development of a woody cylinder as heavy as in *Cordaites* and a correspondent reduction of both the medulla and cortical region; it being noteworthy that these variant features are paralleled by the existing *Dion.* In its simplest form the woody cylinder of the *Cycadeoids* (and cycads) consists in a regularly aligned lattice of anastomosing collateral bundles. The meshes are formed by the leaf gaps. Each cylinder bundle is divided into a conspicuous xylem and phloem region separated by a well-marked cambium. The xylem or secondary wood tracheids are interspersed by occasional parenchyma cells. The "medullary rays" are abundant, deep and made up of sheets of oblong to squarish cells, often two cells thick. Next the pith, the spiral protoxylem first arises as more or less isolated strands, soon merging into the main body of scalariform secondary wood. While the scalariform pits of the mid-region of the tracheids tend to break up into a radial circular pitting of the *Araucarioxlylon* type, it may be said that in nearly all the species the main body of wood is characteristically scalariform. Only in one species is the circular pitting found to form a thin outer zone next to the cambium. Essentially this same variation is found in the wood of modern cycads, except that in the latter there is more development of pitted wood. The cycadeoids thus appear to have been a primitive scalariform type, while the cycads seem to advance toward a pitted condition. But this difference is partly the result of post-Cretaceous change. In both groups the phloem region agrees in a regular alternation of thin and thick walled elements. From the cylinder meshes, or leaf gaps, arise the leaf traces which are single and pass out directly to the leaf bases.

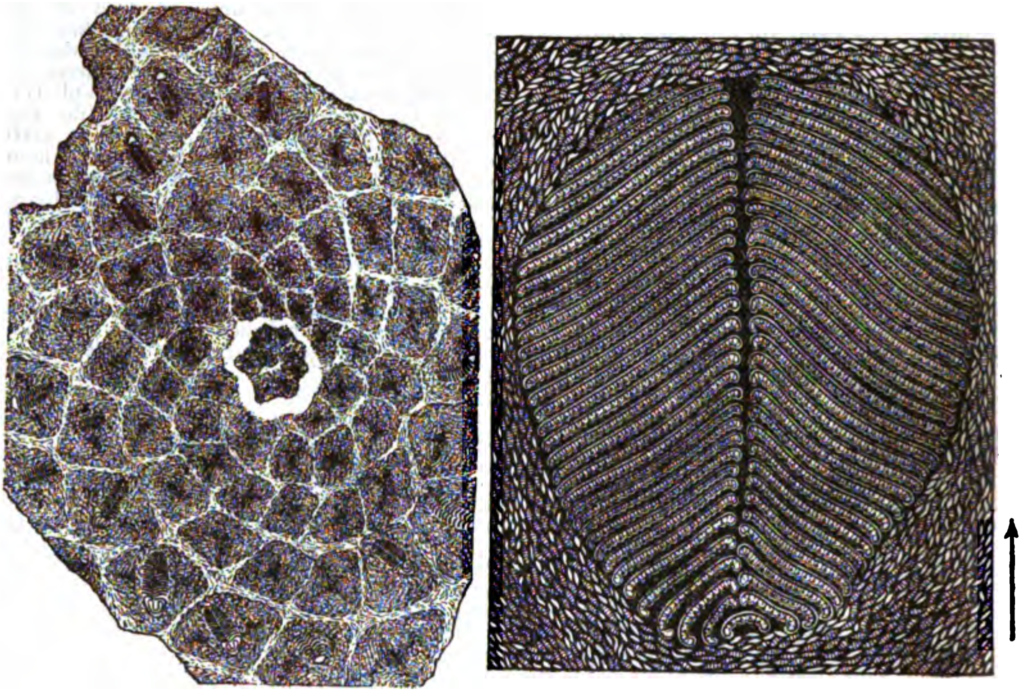


FIG. 9.— Section through summit of petrified (*Cycadeoidea*) trunk from Black Hills, cutting crown of young fronds, with single frond embedded in fine chaff or ramentum (several times enlarged). The pinnules of the (once pinnate) fronds are still folded, back to face, in two ranks.

The leaves of the cycadeoids are in venation reminiscent of the Cordaites. As in that group and the cycads the bundles are mesarch. The inverted omega bundle pattern of the latter, as seen in the transverse petiolar sections, is somewhat unique, but varies in much the same manner as in the fossil forms, where the petiolar bundles are more simply aligned. In cycads the petioles have a prominent median ridge with pinnule insertion in two lateral furrows; but most fossil forms appear to have had a more or less pronounced median furrow, on the sides of which the pinnules were obliquely inserted. Prefoliation of the fossil types was direct, with pinnule growth somewhat preceding rachidal elongation as in the existing *Macrozamia spirali*. See Fig. 9.

The flowers of a number of species of *Cycadeoidea* are known in various stages of growth from initial or minute forms a few millimeters in diameter to the mature ovulate cones or fruits. All the strobili, whatever the stage of growth, indicate more or less clearly an amphisporangiate condition; but there is conclusive evidence for both bisexual and monœcious species, with a probability that certain others were diœcious. Briefly, the flower is a short lateral axillary shoot, always invested in a husk of hairy bracts (cf. figures 11–13). At the centre is an immature ovulate cone, enveloped by a staminate disc. The buds vary from a few centimeters long by a half centimeter in diameter, to forms 5 to 10 centimeters in diameter. (Fig. 11). The marvelously perfect silicification of the flowers is due to the protected position in which they grew packed in amongst the old leaf bases; but even so, the fossilization of such delicate organs as stamens and pollen must be regarded as fortuitous. In species where the peduncles elongated no fruits were left behind. The great number of fruits borne by various mature trunks is a striking feature, indicating in several of the species monocarpy, or fruit growth for a single season only, followed by sterility and death. The stamens are as in the far more reduced amphisporangiate flower of *Tumboa*, united into a campanulate disc, hypogynously inserted. The border of the campanula rises to nearly the height of the immature central cone and then splits into discrete sporophylls. Each of these then sends up two wing-like spurs and at the same time the rachidal tips turn inward and downward along the surface of the cone — that is, the component fronds of the flower-bud are of deflexed or conduplicate prefloration. The sporophyll spurs rise closely appressed each to each, forming instead of a rounded summit a spired dome inside the bract husk. The outer surface is toward the apex quite tomentose. Each stamen is once pinnate with the pinnules reduced and bearing two lateral rows of pendent bivalvate synangia, varying from a few to 10 or 12 to the row. As densely packed in the flower-bud, the synangia show strong appression faces (Figs. 12, 13), but are of essentially the same structure as in the existing tree ferns of the genus *Marattia*. The sporangia in two facing rows of 10 or 12 each resting in the synangial valves are often filled choke-full of well-conserved pollen. The grains are much like those of existing cycads, though tending to reach a slightly larger size. It is noteworthy that some of the discs are considerably reduced and that related forms of the Mexican Liassic have a nearly simple campanula. See series of Figs. 11–14.

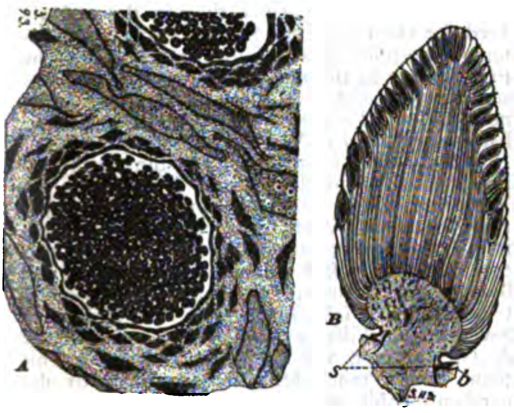


Fig. 10.— Sections through petrified seed cones of *Cycadeoidea*. *A*, the transverse section shows the bract husk in solid black, with the interior mass of seed stems also in black. *B*, longitudinal section of cone, showing staminate collar (*s*), receptacle bearing the mass of seed stems and sterile scales, and outer seed zone. About natural size.

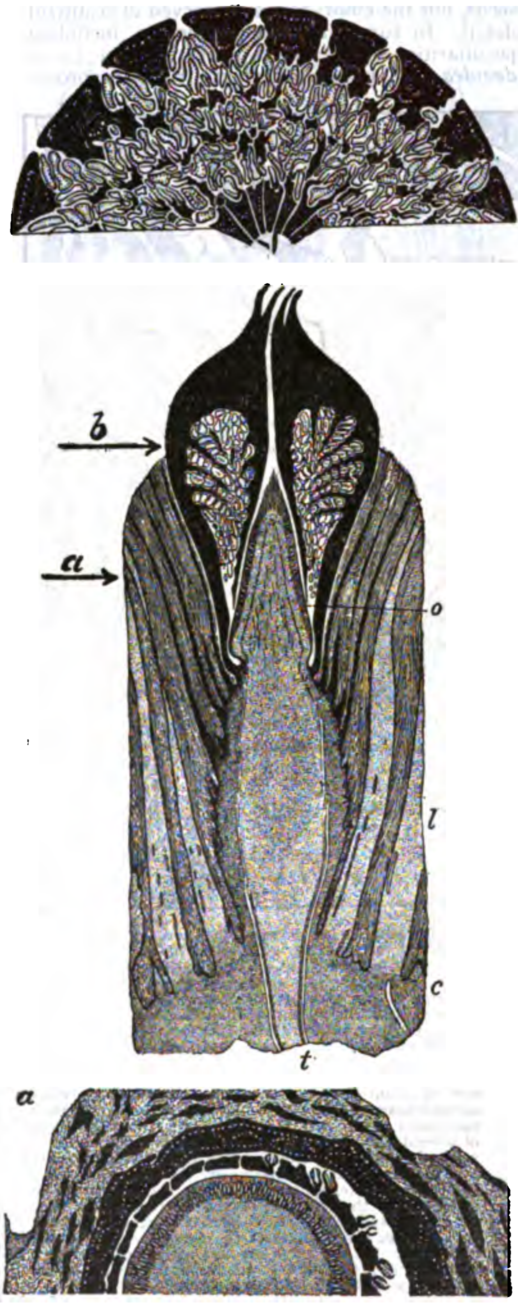


Fig. 11.— Longitudinal section of amphisporangiate flower bud of *Cycadeoidea* (middle figure), with transverse sections of the same cut on levels *a*, *b*. The latter are about twice natural size. See text also **Fig. 12.**

The mature *ovulate cone* (Fig. 10) is of inverted pear shape and consists in a flattened to conical receptacle, bearing a closely interlocked series of sterile and fertile scales. At the periphery all the scales are sterile, but in all the central parts of the cone, as so clearly seen in the transverse sections, the fertile scales are so distributed that each is surrounded by some regular number, as from five to six, or five to seven of the more flattened infertile scales. Each megasporophyll bears a single erect and terminal seed, generally from the size of a small grain of rye to a large grain of wheat, while the infertile scales rise about and overtop this seed, so that their expanded ends come to surround the micropylar tubes in a series of interlocking rosettes. The seeds are radiospermic, five to six angled like those of Palæozoic rather than Mesozoic times, exalbuminous or nearly so, and dicotyledonous. The testa is rather reduced, triple-layered with a middle stone one or two cells thick and non-vascular. These are the only known fossil dicotyledonous seeds, but the embryos are conserved in beautiful detail. In form and testal structure, including peculiarities of the micropylar tube, the *Cycadeoidea* seed presents certain striking approximations to the seeds of *Gnetum gnemon* and *G. africanum*, as proved by Emily M. Berridge and Mrs. Thoday.

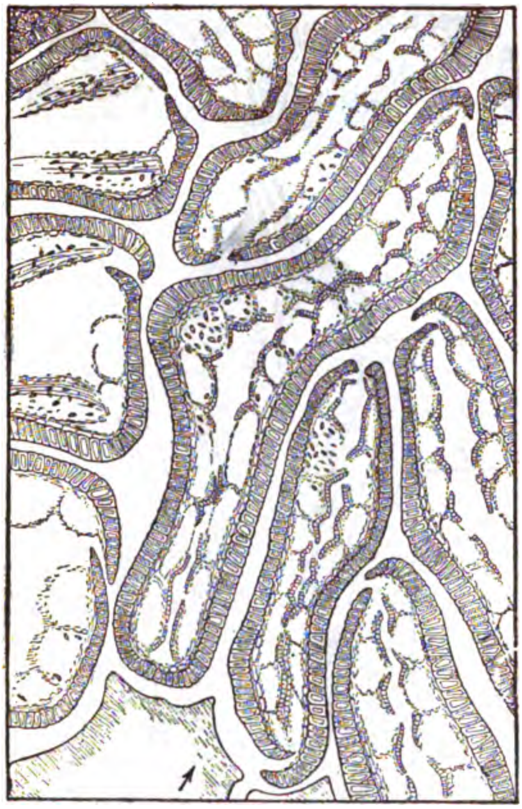


FIG. 12.— *Cycadeoidea dacotensis* Macbride. Portion of a transverse section through unexpanded microsporophylls of a bisporangiate strobilus, cutting a rachis and adjacent synangia. In the central synangium the outer covering of heavy walled prismatic cells is seen to be followed by a thin walled layer from one to several cells thick, to which adhere the sporangial loculi closely ranged in two rows — one on each side of the synangium. Each loculus is usually delimited by a thin band of collapsed cells with adherent pollen grains, and each row of loculi is bounded on the inner side by well-defined tissue a single cell in thickness, except between the angles of adjacent loculi where there is a thickness of several cells. Thus is formed the two opposed inner walls of the two valves into which the synangium splits in dehiscing. Cut more obliquely the two inner walls present a striate appearance. The tips of the three synangia on the left side of the figure are cut very obliquely, and comparison with the other synangia hence shows the position of the dehiscence slit in the outer wall. At the lower left-hand corner of the figure a portion of a transversely cut rachis is marked by an arrow. × about 25. Cf. next figure.

The Williamsonian Tribe.—The boundaries of fossil groups are always obscure, or at least inferential. They change as discovery proceeds; but they are never settled. So, coexistent with the *Cycadeoideæ*, and without sharp demarcation, stands the related and far greater group of dissociated fossil remains conveniently termed the Williamsonian Tribe. This tribe, taking the term in its very broadest sense, thus designates that dominant and varied but imperfectly known assemblage of Mesozoic plants, to which the silicified cycadeoids afford the structural key. These are, too, the proangiosperms, as they were with much foresight called by the French palæobotanist Saporta. Obviously, accessions of petrified forms are few; but the discovery of related casts and imprints is only begun. The latter are in a sense the more important, since they in the end afford the chief evidence for the variety and extent of extinct cycadophytan vegetation. The first attempt at the reconstitution of a Williamsonian cycadeoid was that of *Zamites*, or, as now called, *Williamsonia gigas*, by the English palæobotanist, W. C. Williamson (1870). But his conclusions, based on the casts and imprints of stems, leaves and fruits from the Yorkshire coast, failed to convince contemporary botanists. With *Cycadeoidea* understood, it is found, however, that the Williamson restoration only lacked completeness. By far the best-known member of the Williamsonian tribe is the *Wielandiella* from the Rhätic of Sweden, as skilfully studied and restored by A. G. Nathorst, and shown in the plate. This plant had a much branched, scandent or decumbent habit and bore very small perfect flowers with reduced discs. Because of great age and plastic features *Wielandiella* must be regarded as the most important cycadeoid; but unfortunately the stem structure remains unknown. The *Pterophyllum Fayoli* of the French Carboniferous is one of the oldest and handsomest of the leaf forms; while the Indian (and cosmopolitan) *Dictyozamites* had the significant feature of net-venation. The Williamsonians leave behind approximately the record of emergence and extinction indicated in the appended table. In order to keep the form simple (and more nearly correct), various types doubtless related, such for instance as the Carboniferous to Permian *Plagiozamites*, are omitted.

WILLIAMSONIAN TRIBE	Trias	Rhaet	Jura			Cretaceous		
			L.	M.	U.	L.	M.	U.
Pterophyllum	→						→	
Zamites	X							→
Podozamites		X					→	
Dioonites		X					→	
Anomozamites		X				→		
Nilssonia		X				→	(?)	(?)
Glossozamites						→		
Sewardia					X	→		
Otozamites		X			→			
Sphenozamites				→				
Ptilophyllum			X	→				
Dictyozamites			X	→				
Wielandiella		→						

As far as fossil preservation goes, *Pterophyllum* and *Zamites* are the representative ancient lines, with *Sphenozamites* as a relative merely characterized by oddity of leaf form. And these old lines pass on to add their quota to the great Williamsonian group of the Rhætic, the period of most rapid evolution. Culmination occurs in the lower Jura; while extinction begins in the middle Jura and progresses steadily to the upper Cretaceous, where the Cycadeoideas also find their final representation in both Europe and America.*

Cycadeoid Relationships.— In comparing the stem and leaf structure of cycads and cycadeoids it is seen that the distinct differences generally have the nature of singularities accentuated by separation in time. The existing cycads go to the Jurassic. Then, doubtless, they still retained their ramentum and various older features. The main gap is due to the organization of the sporophylls into cones in the cycads, into flowers in the cycadeoids; and that this severance did not occur later than the Permian is an inference resting not merely on the general evidence, but on the cognate fact that the coniferous types also underwent much similar change in that age. The fossil trunks differ from the modern in four lesser, although distinct features, either of which affords a basis of separation. Firstly, in the cycadeoids the single heavy leaf trace of horse-shoe section arises from the lower angle of the leaf gap and passes directly out to the leaf base, while in the cycads the trace is double. In them, the two strands sometimes nearly girdle the trunk, although such girdle leaf traces are less in evidence in *Zamia* and *Stangeria*. Secondly, while these "girdle traces" may have a concentric structure, the only cycadeoid cortical traces which are concentric pertain to peduncles. Thirdly, there are sometimes found in the cycad pith vascular cone domes due to the nearly or incipiently terminal position of the enormous cones. As the vegetative axis reasserts itself the peduncle bundle strands and cylinder are grown round by the main woody cylinder. No parallel can arise in the cycadeoids, where the peduncles are all lateral, as indeed they are in most cycads. Fourthly, peduncular centrifugal wood, the remnant of the old cryptogamic wood, and still present in some modern cycads, is entirely lost in the cycadeoids, notwithstanding their greater age. In fructification the cycads and cycadeoids at first sight appear utterly dissimilar. But on closer consideration important reciprocal relationships appear. There is an Indian form suggesting a staminate whorl, rather than a disc; while there is no question of the strobilar nature of the ovulate fruit; whether to be regarded as a cone, or as an inflorescence made up of secondary axes of sterile scales clustered about a central seed stem, somewhat after the manner of the *Pandanus* cone. Furthermore, diffuse strobilar types, or those with more leafy sporophylls, are in evidence in Mesozoic times in both coniferous and other gymnospermous types. Also, it appears that in gymnosperms there are distinct gradations from carpellary leaves to cone scales, and that there is no impassable hiatus between cones, whorls of fertile leaves and discs. In cycads the microsporophylls are reduced to cone-scales, while the magasporophylls are in the carpellary stage. In the cycadeoids exactly the opposite, or complementary course of change went on; the seed is simple stalked (as in Araucaria), and the microsporophyll is frond-like. It has, too, that curious eared feature, which also appears primitively significant. Just as in various cycad cones both types of sporophylls have an eared or diceratoid character, so in the *Cycadeoidea* microsporophyll the same feature recurs; and the further fact is there learned for the first time that the position or insertion of the spore in the so-called dorsal or ventral position may depend on the mode of prefloration and reduction. Thus, owing solely to the manner in which the sporophylls of *Cycadeoidea* are or-

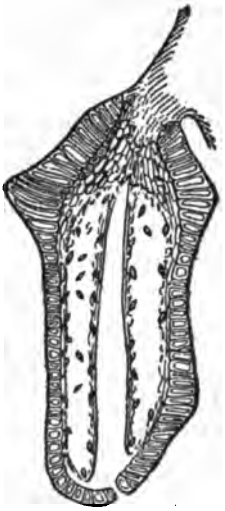


FIG. 13.— *Cycadeoidea dacotensis* Macbride. Longitudinal section (in the narrow direction) through a synangium, showing attachment to the sporophyll, the several layers of the synangial wall, its dehiscence, the attachment of the sporangia, and the median sulcus between them. The basal buttressing of the outer wall is characteristic. Pollen grains shown enlarged. X 37.

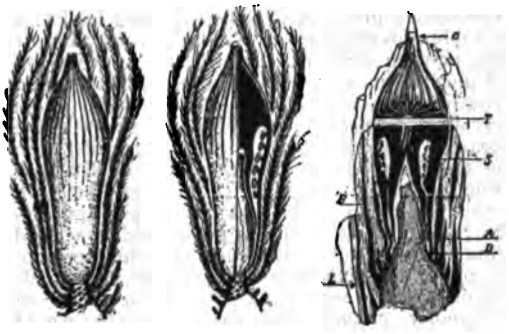


FIG. 14. — Views of the amphisporangiate flower bud of *Cycadeoidea colossalis*. Partly diagrammatic (to left); but on the right the transversely cut summit, with longitudinal section of young seed cone (*A*), and microsporophylls (*B*). Nat. size.

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* Cycads, it has been said, "are to the vegetable kingdom what Dinosaurs are to the animal, each representing the culmination in Mesozoic times of the ruling dynasties in the life of their age." They are more. As the boundaries of the Williamsonian Tribe are extended, many climatic and paleophyte factors must come into view; while the bearing on the evolution of modern types is incomparably clearer than in the case of ancient reptiles, where the myology always remains partly doubtful, and the mode of reproduction wholly obscure.

ganized into a disc, the synangia reach insertion on the superior surface, although of certain derivation from pendent Marattioid types. And this evidence bears directly on the origin of the ovuliferous scale of conifers. It can be readily seen that reduction of an eared megasporophyll, preflorately deflexed, must lead to a complex ovuliferous scale simulating that of the modern conifers. Finally, in the article on *Araucaria* it was pointed out that a certain parallel with *Cycadeoidea* exists. Aside from cycads, *Araucaria* must be considered the nearest relative, despite the floral parallel seen in the *Tumboa* disc and the seeds of *Gnetum*. Fundamentally important is the fact that with the splitting up of the scalariform pits and loss of tracheidal end walls, vessels could arise, and that with medullar decrease and the development of storage tissue, essentially dicotyledonous wood structures like those seen in *Magnolia, Drimys* and *Trochodendron* would be reached. Taken in conjunction with the floral plan, simulating that of *Liriodendron* and other Magnoliaceæ, there is indicated a possible, if not even a probable, mode of angiosperm derivation. Narrow indeed must have been the gap between upland and especially boreal cycadeoids and the true precursor or pro-angiosperms in early Mesozoic times. The only alternative hypothesis to angiosperm derivation from within or near to the cycadeoid stock, is a far-reaching homoplasy and parallelism continuing throughout all post-Palæozoic time. See CYCADOPHYTA; PALEOBOTANY.

Bibliography.— The record of discovery and investigation of the Cycadales, existing and fossil, is to be found mainly in the scientific writings of Buckland, von Mohl, Solms-Miguel, Lignier, Zeiller, Fliche, Nathorst, Scott, Worsdell, Stopes, Seward, Ikeno, Webber, Ward, Chamberlain and Wieland. The titles are given with essential completeness in the bibliography appended to Wieland's 'American Fossil Cycads' (Carnegie Institution of Washington Publication No. 34, Vol. I, 1906; Vol. II, 1916). For a still more recent account consult Seward's 'Fossil Plants' (Vol. III, Cambridge, England, 1917).

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CYCADOFILICES. See PTERIDOSPERMÆ.

CYCADOPHYTA, a term of convenience for all cycad-leafed plants, introduced by A. G. Nathorst. The great majority of such plants are extinct and of unknown fructification, but so far as discovered they are naked seeded or gymnospermous. The apposed gymnosperm group Coniferophyta is now also used for the living and fossil plants with foliage like that of pines, araucarias, etc. See CYCADALES; PALEOBOTANY.

Perforce any group of plants mainly fossil is homogeneous or natural only with respect to its foliage, the flowers and fruits of extinct forms being seldom determinable with certainty. The Cycadophytes thus include frond types extending from those with pinnules like the existing *Zamia Wallisii* a foot and a half long by a foot in breadth to very narrow linear forms. The double bifurcate condition in *Cycas Micholitzii* suggests easy transition toward *Ginkgo* (q.v.). There may be a single midrib as in *Cycas,* but the appearance is often very fern-like with parallel to dichotomous lateral veins. Venation is mainly dichotomous, with easy transition into typical netted venation such as that of the Jurassic *Dictyozamites.* An interesting intermediate form, cosmopolitan in the later Mesozoic, is the genus *Ctenis.* As now used, the Cycadophyta are not restricted to the pinnate, or even bi-pinnate fronds like *Bowenia* of the Malaysian region. Many of the species had simple blades sparsely inserted on slender stems after the manner of dicotyls. Such may be arbitrarily included because their relationship to forms with decided cycad foliage has been proved. (See description of *Cycadeoidea* and *Wielandiella* in CYCADALES). Theoretically the Cycadophytan blade of the *Stangerites,* or the *Taeniopleris* type, must approach primitive dicotyl blades like those of the early Magnolias (*Liriodendropsis*). In the latter there is gradual increase in size of the sparsely set parallel veins with gradual invasion of the finer *marginal net.* That is, the actual *vein bulk* remains much the same, but the distribution of the veins as a supporting framework is different and stronger — meeting the needs of varied environments and of lofty trees growing in the open.

A fairly searching, though necessarily alternative classification of the Cycadophyta taken as a vast complex of forms extending back to the Carboniferous Age, and constantly being added to in the course of paleontologic discovery, is the following:

I. CYCADALES (CYCADS)

Cycadaceæ	Zamiæ	(A) Zamia, Microcycas, Ceratozamia, Dioön. (B) Encephalartos, Stangeria, Macrozamia, Bowenia.
	Cycadeæ	Cycas
(incertæ sedis)	Pseudocycadeæ	Pseudocycas Cycadites Stangerites
	Podozamiteæ	Podozamites Plagiozamites Sphenozamites

II. HEMICYCADALES (CYCADEOIDS)

Pericycadeoidaceæ (Pericycadeoids)	Cycadeoideæ (a petrified series)	Cycadeoidea Fittonia, etc. Amphibennettites, etc.
	Williamsoniæ (The Williamsonian tribe)	Williamsonia Bucklandia Zamites Ptilophyllum Otozamites Pterophyllum Glossozamites Dictyozamites Cycadolepis
Apocycadeoidaceæ (Hemicycadeoids)	Microfloræ	Wielandiella Williamsoniella
	Holophytæ	Anomozamites Nilssonia Taeniopteris Ctenis Pseudoctenis Ptilozamites Macrotaeniopteris

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CYCADS. See Cycadales.

CYCLADES, sĭk′lạ-dēz, or **KYKLADES,** the ancient and likewise the modern name given to the principal group of islands in the Grecian Archipelago, now belonging to the kingdom of Greece and formed into a separate province. The largest islands of the group are Andros, Paros, Myconus, Tenos, Naxos, Melos and Thera or Santorin. They are situated between lat. 36° and 38° N. and long. 24° and 26° 30′ E. They are generally mountainous and evidently of volcanic formation. They produce southern fruits and large quantities of marble, limestone, slate, gneiss, marble and eruptive rocks. Wine, brandy, hides and tobacco are exported. Hermopolis is the principal trade centre and capital. Pop. about 130,-378.

CYCLAMEN, sĭk′lạ-mĕn, a genus of perennial herbs of the natural order *Primulaceæ*. There are about a dozen species, mostly natives of the Caucasus and the Mediterranean region, and characterized by flattish turnip-like tubers or corms, long-stemmed, more or less rounded or heart-shaped leaves and solitary, single flowers with reflexed petals of great range of color. The best-known species grown in America is *C. latifolium*, popularly known as *C. persicum*. It has produced a very large number of horticultural varieties, including some double forms, and is probably the most satisfactory window gardening plant, because of the profusion of its blossoms during many months and also because of the simplicity of its culture. The seeds are sown in early winter and kept steadily growing until the following winter, when they should commence to blossom; that is, in from 12 to 15 months. The roots must not be allowed to dry up like other bulb roots. The plants do not stand the heat of American summers and are therefore less popular as garden flowers than in Europe. The name sow-bread is sometimes given to the species chiefly cultivated in the United States, because swine are fond of the acrid tubers. The root is a drastic cathartic and is occasionally used in medicine.

CYCLE (Gr. κύκλος, Lat. *cyclus*, a circle) is used for every uniformly returning succession of the same events. On such successions or cycles of years rests all chronology, particularly the calendar. A period of 28 years is called a solar cycle and serves to show the day of the week falling on the first day of January in every year. The lunar cycle is a period of 19 years, after which the new moon falls again on the same day of the month. Besides these two cycles, which are indispensable for the calculations of the calendar, there are some others, several of them known by the names of periods. In China a cycle covers a period of 60 years; hence the poet, Moore, may have had in mind a definite length of time when he used the expression, «A cycle of Cathay.»

CYCLE. See Internal Combustion Engine.

CYCLOID, the curve traced by any given point in the circumference of a circle which is rolled in its own plane upon a straight line. The rolling circle is called the generating circle and the chosen point the tracing point. The straight line is called the base of the cycloid, and the two points on the base where the curve begins and ends are the cusps. The cycloid is commonly illustrated by reference to a wagon-wheel moving along a perfectly smooth road.

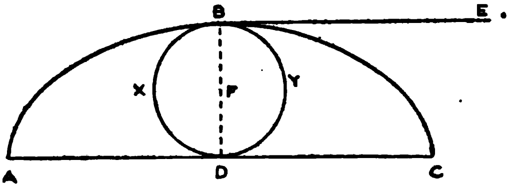

Fig. 1.—ABC, the cycloid traced by the point B of the circle DXBY as it is rolled along the base ADC. The points A and C are the cusps of the cycloid and the point B at its centre, the vertex. The line BE is the tangent of the cycloid at its vertex.

Each point in the outer circumference of the tire of the wheel describes a cycloid during its transit from contact with the road at one point (or cusp) to the position where it is again in contact with the road. The base of the cycloid is obviously equal to the circumference of the generating circle, as it is measured off therewith. The length of the cycloid curve is four times the diameter of the generating circle. The area included between the cycloid and its base is three times the area of its generating circle. If the cycloid be inverted, so that its concave side is uppermost, a ball under the impulse of gravity alone, rolling down the curve from any point in the curve, will reach the lowest point, or vertex, in the same time that it would if started at any other point in the curve. For this reason the cycloid is called the isochronal or isochronous curve. It is also known as the curve of swiftest descent, because the rolling ball will reach the vertex in less time by following the cycloid than if it moved along any other path, even a straight line. The involute of a semi-cycloid, starting from the vertex, is a similar cycloid (Fig. 2). This fact coupled with the isochronal character of the curve, led the horologists to adapt the cycloid to the clock, aiming by means of a pendulum swinging always in the same time, no matter what the length of the arc, to gain a timekeeping device that would not vary. The plan failed through unavoidable friction. The curve of the cycloid is now chiefly of use in the arts in the shaping of the teeth of cog-wheels, the cycloid exhibiting less friction than any other form.

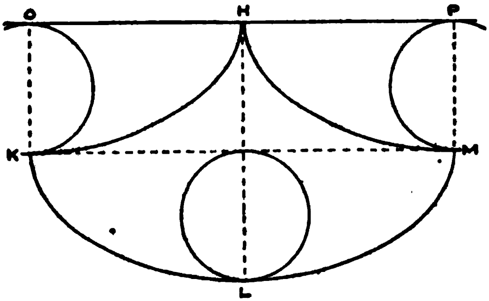

Fig. 2.—KLM, the involute of the semi-cycloids KH and HM traced by the point L on the supposed cord wrapped around the evolute KH. The involute is similar to the cycloids whose common cusp is at H, their generating circles being equal.

Several other curves are usually grouped with the cycloid as if related to it. Constructively they are, mathematically they are not. The epicycloid is the curve traced by a point in the circumference of a circle which is rolled around on the outer side of a fixed circle. The hypocycloid is the curve traced by a point in the circumference of a circle rolling around on the inner side of a fixed curve. It is evident that the functions of these two curves cannot resemble or bear any relation to those of the cycloid. The curves known as «trochoids» are more nearly related, as they are assumed to be generated by points connected with the generating circle of the cycloid. The prolate trochoid is traced by a point in a radius of the generating circle of the cycloid. The curtate trochoid is traced by a point outside of the generating circle supposed to be on one of the radii extended. (See Epicycloid; Hypocycloid; Trochoid). Consult Proctor, R. A., 'Treatise on the Cycloid, and All Forms of Cycloidal Curves' (London 1878).

CYCLOID FISHES, an order of fishes, according to the arrangement of Agassiz, having smooth, round or oval scales, as the salmon and herring. The scales are formed of concentric layers, not covered with enamel and not spinous on the margins; they are generally imbricated, but are sometimes placed side by side without overlapping. It corresponds roughly to the modern *Physostomi*, consisting of those fishes which retain the duct from the air-bladder to the œsophagus.

CYCLOMETER, an invention for measuring and recording the distance traveled by wheeled vehicles, extensively used in cycling. Its most important application is in railroading. The apparatus is connected with the wheels of a car, and by recording the number of revolutions tells on a sheet of paper inside the car the number of miles traveled. It is purely automatic, and in addition, by an attachment of extreme beauty and ingenuity, every inequality in the road-bed of a railroad is detected and located.

CYCLONE (Gr. «whirling,» «revolving»), a term originally applied to the violent rotatory tempests of the tropical and sub-tropical regions, called in the West Indies hurricanes; in Senegal, tornadoes; at the Cape of Good Hope, trovados; in the Chinese Sea, typhoons; and on the west coast of Central America, papagallos. The diameter of rotation of such storms is from 200 to 300 miles and sometimes exceeds 500, and the velocity of the wind, according to Humboldt, is sometimes as much as from 200 to 300 miles an hour. The centre of the storm often advances 30 miles an hour. Since the discovery of the rotatory course of winds even at a distance from the tropics the term cyclone has, however, been applied to any system of winds blowing round a centre of low pressure, and a cyclone is distinguished from an anti-cyclone, which is a system of winds with a centre of high pressure. These two systems are always in proximity to each other, though their centres may be, and usually are, very wide apart. In the cyclone there is a gradual rise of barometric pressure from the centre to the circumference, in the anti-cyclone a gradual fall; in consequence of this the tendency of the winds in a cyclone is toward the centre, in an anti-cyclone it is from the centre; a cyclonic system travels in a certain direction from the region where it originates till it is dissipated or destroyed; an anti-cyclonic system generally remains in the region where it is formed, its centre only shifting about within comparatively narrow limits; the isobaric lines of a cyclone, especially near the centre, are almost circular, those of the anti-cyclone extremely irregular, and the atmospheric gradient (that is, the rate of increase or decrease of pressure) is usually greater in the former than in the latter. While the general tendency of cyclonic winds is toward the centre of the cyclone, their actual course is not directly toward that space, but spirally round it, the lines of rotation being nearly the same as those of the isobaric curves. The direction of rotation is stated in 'Buys-Ballot's Law of the Winds,' which in one of its forms is: «Stand with your back to the wind, and the barometer is lower, in the northern hemisphere, on your left hand than on your right; in the southern hemisphere, on your right hand than on your left.» This is due to the rotation of the earth, which has a greater linear velocity at the equator than at the poles, so that the centrifugal flow of dense, dry air to the equator has a westward motion, while the northward flow of light, moist air is deflected to the east. There are important differences in the weather accompanying cyclones and anti-cyclones, but these are so much modified by local circumstances that it is impossible to enter upon them here. Almost the only general observation that can be made on this head is that the air in a region over which an anti-cyclone hovers, especially near the centre, is very dry, and either clear or almost free from clouds. The great cyclonic area of the United States is the central Mississippi Valley, notably in Kansas. Cyclones are less common apparently on the east side of the river and less violent, but occur with some frequency as far east as the Alleghanies. See Meteorology.

CYCLOPÆDIA. See Encyclopædia.

CYCLOPEAN WORKS, in ancient architecture, masonry constructed with large blocks of stone unhewn and uncemented, said to be the works of a fabulous race of giants, the Cyclopes (q.v.). Some of these works were the walls of Argos, Tiryns and Mycenæ. Similar walls are to be found in various parts of Greece, Italy and Sicily, at Persepolis and elsewhere in Asia, and at Cuzco, Peru. The earliest form consists of huge piles of rock, irregularly hewn, the spaces filled up with smaller stones. Later, the stones were hewn to fit one another, and polygonal masonry developed. Consult Petit-Radel, 'Recherches sur les monuments cyclopéens' (Paris 1841); Middleton, 'Grecian Remains in Italy' (London 1812).

CYCLOPES, sī'klō-pēz, a race of giants in the mythology of Greece. The earlier mythology of Hesiod makes them the sons of Uranus and Ge (Heaven and Earth). They belonged to the Titans, were three in number — Arges, Steropes and Brontes — and had only one eye, situated in the middle of their forehead. They were cast into Tartarus by their father, and again by Cronus, but being released by Zeus provided him with thunderbolts, and became his ministers. They were slain by Apollo for having furnished Zeus with thunderbolts to kill Asclepius. Wholly different from these are the sons of Neptune, of whom Polyphemus (q.v.)

was the chief. They are described in the 'Odyssey' (ix, 106 et seq.) as uncouth, one-eyed giants, supporting themselves by the breeding of cattle. According to Homer they resided on the west side of Sicily. A later tradition describes the Cyclopes as the servants and assistants of Hephaistus (Vulcan), engaged in making the armor and metal ornaments for gods and heroes. The name Cyclopes is also given to a Thracian tribe of giants, who according to tradition built the stone works known as cyclopean (q.v.). They were named from their king, Cyclops.

CYCLOPS, sī'klŏps, a genus of small fresh-water crustaceans, type of a family, *Cyclopidæ*, in the order *Copepoda* (q.v.). They are popularly included under the wide title of «water-fleas.» Various species are common as active swimmers in fresh-water pools or slow-flowing brooks, and a few forms have been recorded from the sea. The head-region is not distinct from the first ring of the thorax; there is a pear-shaped segmented body and a long abdomen; both pairs of antennæ are long, and in the male the anterior pair form claspers. There is no heart, the fifth pair of limbs is rudimentary and the second antennæ are without an exopodite. The average length of the commonest species is from two to three millimeters; the males are generally smaller than the females. A very marked feature, to which the name refers, is the single medium eye, usually bright crimson and sparkling like a gem; and not less noticeable are the two large egg-bags carried by the females. They eat both animal and vegetable matter, and are very prolific.

CYCLORAMA, a painted conspectus of a scene arranged in a circular room, so as to afford the eye a single comprehensive view. Battles have been thus presented in the United States in the form of circular panoramas, as that of Gettysburg. See PANORAMA.

CYCLOSTOMI, sī-klŏs'to-mē (Gr. «round-mouthed»), one of the five primary divisions or classes of the craniate *Vertebrata*, also called *Agnatha, Marsipobranchii*, etc. Excluding the doubtful extinct ostracoderms, the cyclostomes have an imperfect, embryonic brain case, no lower jaw, no paired limbs or their supporting girdles, no ribs and no scales. They have a large number of gill pouches, which have a skeleton not homologous with that of the true fishes. The nostril is single, and the rudiments of the pineal and parietal eyes are remarkably perfect. There is no trace of a swim-bladder. The mouth is armed with a peculiar rasping apparatus. The skeleton is purely cartilaginous and the notochord persists in living forms. There are many remarkable structural specializations in the representatives of the three or four subdivisions, and the peculiarities of the living forms are such as to indicate that they are survivals of a once extensive group of fish-like animals; but only a single species of fossil can be referred to here with any certainty. The following may be indicated as orders: *Cycliæ*, with the vertebral column well developed and, like other parts of the internal skeleton, ossified; no external skeleton and no paired limbs; the tail provided with a large diphycercal fin supported by rays; the skull a cartilaginous capsule, with prominent ear sacs, and a large median nasal sac with a circle of cirri about its orifice; this group is represented by a single species (*Palæospondylus gunni*), from the Devonian rocks of Scotland; *Hyperoartia*, having the internal skeleton entirely unossified, with a persistent notochord and no vertebræ; body eel-like with a caudal fin; the mouth a suctorial disc, with the rasping end of a piston-like tongue appearing at its centre; the nasal sac median and its diverticulum not penetrating the palate; and seven pairs of pouch-like gill slits, which communicate with a common respiratory tube distinct from the œsophagus; represented by the single family *Petromyzontidæ*, with the principal genera *Petromyzon* (lamprey, q.v.), *Lampetra, Mordacia* and *Geotria;* and *Hyperotretia*, like the last in the characters enumerated except that the nasal diverticulum (*hypophysis*) perforates the palate and opens into the mouth and there is no separate internal respiratory tube. There are two families of this group, the *Bdellostomidæ*, with 6 to 14 gill pouches on each side opening separately at the surface; and the *Myxinidæ*, with the single genus *Myxine* (hag fishes, q.v.), in which the six pairs of gill pouches have a single common external opening on each side. To these Professor Cope has added the great extinct group *Ostracophori* (q.v.).

CYDIAS, sĭd'ĭ-as, Greek painter: b. the island of Cythnus, one of the Cyclades. Hortensius, the orator, purchased his painting of the Argonauts for 144,000 sesterces (nearly $7,200). This same piece was afterward transferred by Agrippa to the portico of Neptune at Rome.

CYDNUS, a river of Cilicia, rising in the Taurus and flowing through Tarsus into the Mediterranean Sea. The mouth of the Cydnus is often choked with sand and other alluvial deposits. It was on this river that Cleopatra made her voyage to meet Antony.

CYDONIA (named, it is believed, from a place called Kydon, in the island of Crete, of which this fruit is a native); a genus of fruit trees, order *Pomaceæ*. It has leafy calyx lobes and many-seeded cells in its fruit. *C. vulgaris* is the quince; *C. japonica* is an ornamental shrub. See QUINCE.

CYGNUS, sĭg'nŭs («the Swan»), one of Ptolemy's northern constellations. It includes the double star Albiero or β Cygni, the components of which are differently colored, one of them being orange and the other blue. The motions of the double star, 61 Cygni, have been carefully observed, and it has been estimated that the pair together weigh about one-third as much as our sun. It is nine light-years away from us, and so is the nearest star to us except α Centauri. A new star, at present of the 15th magnitude, was discovered by Schmidt at Athens in 1876.

CYLINDER. A *cylindrical surface* is a ruled surface generated by a line moving while parallel to a given line. A *cylinder* is the solid intercepted by a closed cylindrical surface and two parallel planes. A *circular cylinder* is formed by two parallel circular surfaces, called the superior base and the inferior base, and a convex surface terminated by them. There is a distinction between rectangular cylinders and oblique cylinders. In the first case, the axis, that is, the straight line joining the centres of the two opposite bases, is perpendicular to them;

in the second, the axis forms an oblique angle with each base. The cubic contents of a cylinder are equal to the product of the base by the altitude, or the perpendicular distance between the bases. Archimedes found that the volume of a sphere inscribed in an equilateral cylinder, that is, of a sphere whose diameter is equal to the height and also to the diameter of the base of the cylinder, is equal to two-thirds of the cubic contents of the cylinder. A right circular cylinder may be generated by the revolution of a rectangle about one of its sides.

CYLINDER SNAKE, one of a family of small burrowing snakes (*Ilysiidæ*) allied to the *Typhlopidæ* and shield snakes, and retaining vestiges of pelvis and hind limbs, the latter showing in claw-like spurs protruding between the scales on each side of the vent. The form is cylindrical, the scales small, polished and hardly larger on the belly than elsewhere, and the colors bright. The few species are scattered over the Malay Islands and Indo-China, where the common “red snake” reaches a length of two and one-half feet, and occur in Ceylon and South America. A beautiful species in tropical South America is one of those called “coral snake,” and is coral red with black rings. On account of its beauty, perfectly harmless nature, and “for cooling purposes” this snake is said to be sometimes worn as a necklace by the native women.

CYLINDRICAL LENS. See LENS.

CYLON, an Athenian leader, the son-in-law of Theagenes of Megara, who, with the intent to make himself tyrant of Athens, occupied the Acropolis, and being reduced by a blockade, was put to death by Megacles, in violation of his oath to spare him. A war with Megara resulted.

CYMA, sī'ma, in architecture, a wavy molding the profile of which is made up of a curve of contrary flexure, either concave at top and convex at bottom or the reverse. In the first case it is called a cyma recta; in the second a cyma reversa. It is a member of the cornice, standing below the abacus or corona. See MOLDING.

CYMBALS, among the ancients, musical instruments, consisting of two hollow basins of brass, which emitted a ringing sound when struck together. The instruments which are now used in military music, and have been borrowed from the East, have taken their rise from these. In the modern orchestra there are three ways of using them: the most common is to hold the pair one in each hand and strike them so that they graze slightly, obtaining excellent effects in piano and pianissimo; (2) to strike a single one with the drumstick after the manner of a gong; (3) to use a roll with the drumsticks, which is rather rare. They were used in the worship of Cybele, Bacchus, Juno and other deities.

CYMBELINE, sĭm'bĕ-lĭn or sĭm'bĕ-lĭn, or **CUNOBELINUS,** British king of the 1st century: d. about 43 A.D. Not much is known of his career. He was, as is shown by his coins, the son of King Tasciovanus, who ruled in Verulamium. Suetonius calls him rex Britannorum. He was doubtless one of those kings who became close friends and dependents of Augustus. In later years he became involved in troubles with his son Adminius, whom he expelled from Britain, and who, having sought help from Gaius, instigated the expedition that was sent against Britain under Aulus Plautius. Cunobelinus died at this time and his sons Caractacus and Togodumnuus inherited his kingdom. Shakespeare's play of ‘Cymbeline’ was written about 1609. A few statements about Cymbeline and his sons the dramatist took from Holinshed's ‘Chronicle,’ but the story of Imogen forms the ninth novel of the second day of Boccaccio's ‘Decameron.’ These two stories Shakespeare has interwoven, and the atmosphere of the two is not dissimilar. Consult Evans, J., ‘Coins of the Ancient Britons’; Rhys, ‘Celtic Britain’; Mommsen, ‘Römische Geschichte’ (Vol. 5).

CYMBELINE. ‘The Tragedy of Cymbeline’ is the last play in the Shakespeare folio of 1623. Its classification there among the tragedies is surprising, since the editors of the folio made no other such positive error of definition. One would expect to find this play in the list of comedies beside ‘The Winter's Tale,’ which in style and structure it most closely resembles. It is likely that the early editors were influenced by the title, which associates ‘Cymbeline’ with the two tragedies based on early British history, ‘King Lear’ and ‘Macbeth.’ In fact, however, the play is ill named, for its eponymous hero is dramatically less important than either Postumus, Iachimo or Pisanio, to say nothing of Imogen, and the vital portion of the story belongs not to history or even fable, but to pure fiction. From Holinshed's account (first printed, 1578) of the authentic King Cymbeline, or Cunobelinus, and his sons Shakespeare adapted certain points in his drama, and from another passage in Holinshed he derived the outline of the battle in Act V; but the real kernel of the play — the story of Imogen, Postumus, Iachimo and Pisanio — is totally unhistoric. It is a refashioning of one of the imaginative tales in Boccaccio's ‘Decameron’ (ii, 9). Current folk lore and fairy tales, again, offered a third source of inspiration, from which the dramatist drew in his treatment of the wicked stepmother and the romantic adventures of the disguised Imogen (Fidele). Much of the play's charm is due to the “Gothic” diversity of atmosphere and incident which it acquires from the masterly blending of these varied elements. Testimony of language, metre and feeling connects ‘Cymbeline’ with ‘The Winter's Tale’ and ‘The Tempest’ in the latest group of Shakespeare's works, and points to 1610 as probably the date of composition. External evidence for this date is present in a manuscript book of notes on plays witnessed by Dr. Simon Forman, who died in 1611. He gives a detailed analysis of the plot of ‘Cymbeline,’ which it appears from the dates of other entries in his book that he must have seen acted either in 1610 or in 1611. Recently it has been suggested that the play may have been influenced in its structure and atmosphere by the ‘Philaster’ of Beaumont and Fletcher. Consult Thorndike, A. H., ‘The Influence of Beaumont and Fletcher on Shakespeare’ (1901), and the arguments advanced against the suggestion in C. M. Gayley's ‘Beaumont, the Dramatist’ (1914, pp. 386–395).

In 1633 ‘Cymbeline’ was performed before King Charles I, and, as Sir Henry Herbert records, was «well liked by the king.» It was rewritten at least four times to adapt it to the changing taste of later days. Garrick's version was extremely popular both in England and in colonial America, where it was performed (e.g., at Philadelphia) as early as 1767. Garrick, Kemble, Kean and Macready — four great actors of strikingly different personality — were all successively famous in the part of Postumus, and they carried the play triumphantly through the period between the middle of the 18th and the middle of the 19th century. In 1857 Henry Irving played Pisanio to the Imogen of Helen Faucit; 40 years later, in 1896, he played Iachimo to Ellen Terry's Imogen. The two actresses just named are the most distinguished recorded interpreters of Imogen, the greatest rôle in the play; and Miss Faucit (Lady Martin) contributed also the finest literary discussion of the part ('On Some of Shakespeare's Female Characters,' 1885). Hazlitt's praise of Imogen is well known: «Of all Shakespeare's women she is perhaps the most tender and the most artless.»

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CYME, an ancient city of Æolia, which, although styled by Strabo the largest and noblest of Æolian cities, is of little historical importance. The father of Hesiod lived here before he migrated to Ascara in Bœotia.

CYME, sīm, in botany, a mode of definite inflorescence in which the principal axis terminates in a flower and a number of secondary axes rise from the primary, each of these terminating in a flower, while from these secondary axes others may rise terminating in the same way and so on. All the flower-stalks rise to nearly the same height, so that they resemble a compressed panicle. The central or terminal flowers bear first.

CYMRI, kĭm'rĭ, or **KYMRY**, a branch of the Celtic family of nations which appears to have succeeded the Gaels in the great migration of the Celts westward, and to have driven the Gælic branch to the west (into Ireland and the Isle of Man) and to the north (into the Highlands of Scotland), while they themselves occupied the southern parts of Great Britain. At a later period (during the 5th and subsequent centuries) they were themselves driven out of the Lowlands of Great Britain by the invasions of German tribes and compelled to take refuge in the mountainous regions of Wales, Cornwall and the northwest of England. A part of them also crossed over into Gaul and settled in Brittany. Wales may now be regarded as the chief seat of the Cymri (a name which the Welsh still give to themselves), as it is still the chief place where the Cymric dialect of the Celtic language is spoken. A variety of this dialect, called the Cornish, was at one time spoken also in Cornwall, and another variety called the Armorican, is still spoken in some parts of Brittany. On account of the similarity of the name the Cymri have been identified both with the Cimbri and the Cimmerii, but the identification in both cases, especially the latter, is doubtful. The origin of the name is unknown. See Wales.

CYNÆGIRUS, sĭn-ē-jī'rus, Athenian hero, son of Euphorion and brother of Æschylus. The story is told that at the battle of Marathon he lost his hands in attempting to prevent a Persian ship from being pushed off, and then seized the gunwale with his teeth.

CYNARA, a small genus of the family Asteraceæ, in many respects like the thistle. The two best-known species are the artichoke (*C. scolymus*) and the cardoon (*C. cardunculus.*) Both are hardy perennials, found wild in southern Europe and northern Africa. The flowers are sometimes used to curdle milk. See Artichoke; Cardoon.

CYNEWULF, kĭn'ĕ-woolf, Anglo-Saxon religious poet. His name is only known from runes in the poems attributed to him, namely: 'Elene' (Helena), the legend of the discovery of the true cross; 'Juliana,' the story of the martyr of that name; and 'Crist' (Christ), a long poem incomplete at the beginning, the 'Fates of the Apostles' and 'Andreas, or the Legend of Saint Andrew.' The name Cynewulf also occurs as the solution of one of the metrical riddles in the Anglo-Saxon collection. Other poems, the 'Andreas,' the 'Wanderer,' the 'Sea-farer,' etc., have been ascribed to him without sufficient grounds. In the epilogue to Elene, there is an account of his life, which may or may not be authentic. Cynewulf probably lived in the first half of the 8th century. From his poems we may gather that he spent the earlier part of his life as a wandering minstrel, devoting the latter to the composition of the religious poems connected with his name. Editions and translations of his works are by Gollancz, 'Christ' (London 1892); and Cook (Boston 1900); Strunk, 'Juliana' (ib. 1905); Root, 'The Legend of Saint Andrew' (New York 1899); Hall, L. H., 'The Elene: Trans. into English Prose' (ib. 1904); 'Legend of Saint Juliana' (Princeton 1906); and translation into English prose complete, by C. W. Kennedy, 'The Poems of Cynewulf' (New York 1910). Consult also Grein, 'Bibliothek der angelsächsischen Poesie' (revised by Wülker, Göttingen 1883–98).

CYNICS, a school of philosophers founded by Antisthenes, a pupil of Socrates, at Athens about 380 B.C. Opinions differ as to the origin of the name. It is possible that it may have been derived from the gymnasium called Cynosarges (q.v.), where Aristippus first delivered his lectures; or from the Greek word for dog (Κύων), either as a term of contempt for their uncivilized habits, or from their adoption of the dog as a common symbol. This philosophy was a development of the eudaimonistic teaching of Socrates, i.e., that happiness or well-being is the necessary result of virtue alone. Virtue was insight, or the knowledge of the good. One-sided interpretations of this theory led on the one hand to the Cynic philosophy, the precursor of the Stoic, and on the other to the Cyrenaic (q.v.), which was superseded by the Epicurean. The doctrine of virtue as taught by Antisthenes declares it to be the only intelligent conduct of life, not because of the results it brings about, but through itself. This virtue is in itself happiness, and to acquire it man must be unfettered by social or political events. It is attainable through freedom from wants and the curtailing of all desires, except the most fundamental and necessary. Therefore all things must be put to the test of natural and not human institutions to determine their worth. The Cynics forced themselves to despise all the good things of civilization and recognized none of its laws and morals. They soon degenerated and their philosophy lost its idealism in an animalism which they mistook for naturalness. They believed that there was one and only one God, but this monotheism was not clearly defined nor deeply felt. It was rather a logical outgrowth of the desire for simplicity. They had some respect for mental training, as the only thing which would free men from the slavery of ignorance and false standards. However, this philosophy is interesting as a mark of the disposition of the time; an indication of the disintegration of Greek society into individuals. Its very cosmopolitanism was negative; it consisted of denial of allegiance to any civilized community rather than a belief in world-citizenship. To the Cynic philosophy, despite its obscurity of thought and its incomplete vision, we owe two great ideas: the responsibility of the individual as a moral unit; and the supremacy of the power of the will. On these, with better insight and maturer psychology, the Stoics built their saner philosophy. Besides the founder, the most famous of the Cynics were Diogenes of Sinope (412–323 B.C.), Crates of Thebes (about 328 B.C.) with his wife, Hipparchia, Menippus (about 60 B.C.) and Zeno (qq.v.); and in the later Roman period, Demetrius, Œnomaus and Demonax. (See Socrates; Cyrenaics; Stoics; Epicureans). Consult Windelband, ‘History of Philosophy’ (English trans. by Tufts, London and New York 1910); Heinze, M., ‘Der Eudämonismus in der griechischen Philosophie’ (Leipzig 1883); Zeller, E., ‘Socrates and the Socratic Schools’ (English trans. by Reichel 1877); Gomperz, ‘Greek Thinkers’ (English trans. 1905); Caird, E., ‘Evolution of Theology in the Greek Philosophers’ (1904); Mulloch, F. W., ‘Fragmenta philosophorum Græcorum’ (Paris 1867).

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CYNIPIDÆ, the gall-flies (q.v.), a family of insects belonging to the order *Hymenoptera*, the sub-order *Petiolata* and section *Parasitica*. They are a kind of small flies remarkable for their extremely minute head and large, elevated thorax. The females are provided with an ovipositor by which they make holes where they deposit their eggs in different parts of plants, thus producing those excrescences which are known as galls.

CYNOCEPHALUS, sī-nō-sef'ạ-lŭs (Gr. «doghead») a genus of monkeys including the various species of baboon (q.v).

CYNODICTIS, sī-nō-dĭk'tĭs, a genus of primitive *Canidæ* (see Dogs, Fossil) of the Oligocene Epoch in Europe and America, a collateral ancestor of the modern dog family. It was of weasel-like proportions, with long tail, small brain, civet-like teeth and other primitive characters. Most of the species were small.

CYNODON DACTYLON, CAPRIOLA DACTYLON, BERMUDA or **BAHAMA GRASS**, a low, creeping, perennial grass found in most warm and tropical countries, where from its drought-resisting capacity it is used as a common pasture grass. It has delicate leaves and upright, leafy flowering branches which bear three to seven slender divergent spikes. Three of the four species are Australian. In the United States it is dispersed from Pennsylvania to Florida and westward to Texas and California, being hardy from Philadelphia southward. It grows freely on poor, sandy soils, but the leaves are short; on good soil it will grow one or two feet high. It will grow on almost any soil, if not too wet. Its root-stock runs readily, thus making it a valuable grass for binding drifting sands and for holding embankments liable to wash. Being insensible to heat and drought it soon makes a fine sod equally useful for grazing or for a lawn. It is also used for hay and is in bloom from April to October. It will not grow in the shade and it is easily injured by low temperatures, turning brown with the first frosts. It rarely bears seed, except in the extreme Southern States. The usual method of propagation is to chop up the roots, sow them broadcast and plow in, shallow. Once introduced it is hard to get rid of, but it has been eradicated by constantly plowing the land every week or so, or growing oats, followed by cowpeas in rows, which could be cultivated. Its rhizome is used in medicine as a substitute for sarsaparilla. The plant is a favorite food of the wild goat, hence the name *Capriola*.

CYNOGLOSSUM, hound's-tongue, a genus of plants of the family *Boraginaceæ* consisting of about 50 species of coarse herbs of wide distribution in temperate climates. The flowers form scorpioid racemes, as in the allied comfrey and forget-me-not, and are of a reddish color. Seven species are found in America, the best known being hound's-tongue, *C. officinale*. This species is found in waste places from Quebec to Minnesota, and south to Kansas and North Carolina. It has a disagreeable smell like that of mice, and was at one time used as a remedy for scrofula. It is a troublesome weed, native in Europe and Asia. Another well-known species is *C. virginicum*, wild comfrey, which grows from New Brunswick south to Florida, and west to Louisiana and Kansas.

CYNOMORIUM, a genus of parasitic flowering plants, the best-known representative of which is *Cynomorium coccineum*, a fungus-like plant, found in the Mediterranean region. It was long known as *Fungus melitensis*, and enjoyed the highest reputation as a styptic, besides being used as an astringent in dysentery and other maladies. These uses, however, depended on the doctrine of signatures alone, its scarlet color and blood-like juice being interpreted as providential indications of its curative destination for all injuries or diseases accompanied by bleeding. It was jealously guarded by the Knights of Malta.

CYNOSARGES, sī-nō-sär'jēz, in ancient Athens, originally the name of a sanctuary of Hercules and a gymnasium in the east of the city, afterward extended to the suburb of Athens surrounding the gymnasium for the use of those who were not of pure Athenian blood. It was in this gymnasium that Antisthenes, the founder of the Cynics, taught. Consult Weller, ‘Athens and Its Monuments.’

CYNOSCEPHALÆ, sĭn-ŏs-sĕf'ạ-lē (Gr. signifying dogs' heads), the name of a range of hills near Scotussa in Thessaly, memorable for two battles fought there in ancient times.

The first was 364 B.C., between the Thebans and Alexander of Pheræ, in which Pelopidas was slain; and the second, 197 B.C., in which the last Philip of Macedon was defeated by the Roman consul Flaminius.

CYNOSURE, sĭn'ō- or sī'nō-shūr, or **CYNOSURA,** an old name for the constellation of the Little Bear or Ursa Minor, which contains the pole star in the tip of the tail. Cynosure, in a figurative sense, is hence used as equivalent to something which attracts general attention or draws all eyes toward it, as the pole star attracts the attention of the mariner. The word literally means dog's tail.

CYNOSURUS, a genus of grasses. See DOG'S-TAIL GRASS.

CYNTHIA, the moon; a surname of Artemis or Diana, the moon goddess. In mythology Mount Cynthus, on the island of Delos, is said to have been the birthplace of Diana.

CYNTHIANA, Ky., city, county-seat of Harrison County, on the south fork of the South Licking River and on the Louisville and Nashville Railroad, 33 miles northeast of Lexington. It is a trade centre for farming and stock raising, and is the seat of Harrison Female College. It has carriage, plow and cigar factories, distilleries (noted for their Bourbon whisky), good schools, public library, two national banks and several newspapers. During the Civil War, Gen. John Morgan with 1,800 men captured Cynthiana and defeated the Union cavalry of about 500 men under General Hobson. On the following day (12 June 1864) the Union army sent reinforcements to the number of 5,400 men under General Burbridge which defeated Morgan's army. The Union army lost 414 men, the Confederates about 600. Pop. about 3,500.

CYNTHIUS, surname of Apollo, the sun god, from Mount Cynthus, on the island of Delos, at the foot of which he had a temple, and on which he was born. Diana, his sister, is called Cynthia.

CYPERACEÆ, sī-pē-rā'sē-ē, a family of monocotyledonous grass-like plants including more than 2,000 species. These herbaceous plants generally grow in moist places on the margins of lakes and streams, with a cylindrical or triangular culm with or without joints; the leaves are sheathing. The family comprises the genera *Carex, Scirpus, Cyperus, Schœnus* and others.

CYPERUS, sī-pē'rus, a genus of perennial herbs of the family *Cyperaceæ* (q.v.). The numerous species, which are natives of tropical and temperate climates, are characterized by having rootstocks or tubers, grass-like leaves, simple stems sparsely leafy below, perfect flowers in small compressed spikes which are arranged in compound umbels with numerous more or less attenuated bracts, the form of the inflorescence having suggested the popular names umbrella plant and umbrella palm, which are perhaps most frequently given to *C. alternifolius.* This species is a very popular window garden and greenhouse plant, native of Madagascar. It is readily propagated by means of seed or by division of the larger plants, and is easily cultivated in any good potting soil kept moist. It does best in a moist atmosphere. Many of the species are troublesome weeds in cultivated fields; some are useful for food, their underground parts being starchy and mucilaginous; the tubers of others are used in perfumery. The chufa (*C. esculentus*) is valued in the Southern States for its tubers, upon which swine thrive well. Papyrus (q.v.) is the product of *C. papyrus.* Some species have been used in medicine but are now rarely employed.

CY-PRÉS, sē'prā (Old Norman French for «as near as possible»), the principle in the American and English law whereby a gift legal in form, which cannot be administered exactly as the testator specified, or which is not definitely specified, may be applied «as nearly as possible,» according to the intention of the donor. Cy-près is a doctrine of the early common law, by which, if gifts were made for charitable uses that were illegal or contrary to public policy or that were impossible to be carried into effect, the king, as general supervisor of charities, or the chancellor acting for him, could devote them to such other charitable purposes, «*cy-près* or as near as possible» as intended in the original gift. This power does not exist in the United States; the majority of cases wherein the cy-près doctrine is applied comes under charitable bequests on gifts for the advancement of education. In the United States it is held that the equity courts cannot make valid charities which are uncertain, but where charitable trusts have once been in part administered as directed by the testator, such action will prevent the trust from being defeated by change of circumstances. Where only a general charitable intention is expressed, as, relief of the poor, aid for the injured, under the cy-près doctrine the court may direct the disposal of the gift to some form of charity «as nearly as possible» like that mentioned or indicated by the testamentary gift of the testator. The laws based on the cy-près doctrine vary in different States. For instance, in the case affecting a Universalist Convention of Alabama, it was ruled that the doctrine of cy-près is not recognized in Alabama, as being based on the prerogative power of the king of England, recognized and administered by the English Court of Chancery with reference to trusts. The doctrine of cy-près is recognized in New Jersey but cannot be applied where the donor himself has directed what disposition shall be made of the trust property in the event of a failure of the charitable use to which he has directed it to be devoted. In a case affecting the Presbytery of Jersey City, N. J., a trust, which is declared for public worship and instruction for the benefit of an indefinite number of persons according to the Presbyterian faith and polity, is enforceable either exactly or, under the doctrine of cy-près, approximately. For further ways in which the cy-près doctrine is applied compare ESTATE; FEE-TAIL.

CYPRESS, the popular name for members of the genus *Cupressus* and for certain species of the related genera, *Taxodium* and *Chamæcyparis.* There are about a dozen species of *Cupressus,* which are trees or sometimes shrubs with small aromatic, evergreen opposite leaves and tiny monœcious solitary flowers, the pistillate developing into almost globular cones containing numerous seeds which mature the second season. The best-known species is probably the common European cypress (*C. semper-*

virens) which has been introduced into the United States. It is a stately tree of about 80 feet, of remarkable longevity, and of wide utility principally on account of its remarkably durable wood, which is highly resistant to the attacks of insects. It is yellowish or reddish, hard and dense and is used in cabinet work and in the making of musical instruments. Some writers believe it is the «cedar» and also the «gopher» wood mentioned in the Bible. *C. torulosa* is probably the tallest species; it is a native of the Himalayas and attains a height of 150 feet. The hardiest species and perhaps the one most frequently planted is *C. macnabiana,* a bush with several small trunks or a small, dense, pyramidal tree of about 20 feet It is a native of California, where it is very popular in private grounds and public parks. Another popular Californian species is *C. macrocarpa,* generally known as the Monterey cypress. It usually grows about 40 feet tall but occasionally nearly doubles that height. It thrives well even upon poor soils and makes a rapid growth under favorable conditions, but is more susceptible to frost than the preceding species. Numerous horticultural varities of diversely colored foliage and varying habit and height have been developed. *C. funebris,* a native of China, ranks about with the last-mentioned species in hardness, rather excels it in height, and is frequently planted on account of its wide-extending, pendulous branches and twigs. The cedar of Goa (*C. lusitanica*) is of unknown habitat but is frequently planted in southern Europe.

The bald or deciduous cypress (*Taxodium distichum*) is one of the most valuable of American timber trees, its straight and close-grained, soft, brown wood being highly esteemed where exposure to moisture is expected and where durability but not great strength is demanded. It is very largely used in greenhouse construction. Its range is from Delaware to Missouri and southward to the Gulf States, being especially abundant in swamps, but it will thrive with a more or less noticeable change of habit in dry ground. It is a highly ornamental tree often 150 feet tall and sometimes more than 10 feet in diameter, with buttressed trunk, brown, flaky bark, erect or spreading branches bearing narrow light green leaves, purplish staminate flowers and nearly globular cones. The spread of the branches in old specimens is often more than 80 feet. It has developed a large number of horticultural varieties and is very popular as a park tree as far north as New York, about its northern limit of hardiness. In the Southern swamps the trees develop «knees» from their roots. These knees, which are sometimes 10 feet tall, are supposed to act as aërators, but their function is not definitely known. When fully developed their tops are above high-water level.

The species of *Chamæcyparis* best known as cypress are *C. obtusa,* the hinoki cypress, and *C. pisifera,* the Sawara cypress. *C. lawsoniana,* Lawson's cypress, is a native of the Pacific Coast States; the other two are natives of eastern Asia. They attain heights of about 100 and 120 feet, respectively, have developed numerous horticultural varieties and are frequently planted in parks for their ornamental foliage and graceful habit of growth. See CEDAR.

CYPRESS VINE, *Ipomæa Quamoclit.* See IPOMŒA.

CYPRIAN, sĭp'rĭ-an, **Saint (Thasius Cæcilius Cyprianus),** African bishop, martyr and one of the fathers of the Church: b. about 200; d. Carthage, 14 Sept. 258. He was of patrician parentage and inherited a considerable estate. Having received the highest education he professed rhetoric with eminent success in Carthage and in his school held disputations with representatives of the schools of philosophy and with believers in the Christian religion, with the result that he applied for admission in the Church. Shortly after being baptized (246) he was ordained priest and then was elected by the Christians of Carthage to be their bishop (248). In the persecutions of the Christians by Decius (249–51) he prudently withdrew from Carthage and lived in retirement, but on the accession of Gallus (251–53) he returned to his see. There had been lively controversies among the churches over the question of readmission to the Christian communion of those who in times of persecution had renounced the religion of Christ; churches in Asia Minor and churches in Africa, among them the church of Carthage, had in synods and in the letters addressed by their bishops to other bishops, strongly condemned the practice of some churches, among them that of Rome, in accepting as valid the baptism conferred by heretics. On the question of readmitting the *lapsi* to communion Cyprian favored leniency: he would readmit the fallen on proof of sincere repentance. But he would not acknowledge the validity of baptism conferred by an heretical minister. On this point he was at variance with the tradition and practice of the Catholic Church, and in support of his view he sent to Pope Stephen the acts of a synod of Carthage in which the invalidity of baptism conferred by heretics was declared. Pope Stephen replied that the tradition of the Church was opposed to this and bade Cyprian not to innovate, but to recognize as true and valid baptism administered by heretics if given in the name of the Trinity. Firmilian, a contemporary, states that Stephen threatened Cyprian with excommunication. To the threat the bishop of Carthage replied with great heat, but in the entire controversy on rebaptism he never calls the authority of the Pontiff in question, although he laments what he calls the injustice of the decision. In this controversy the final decision of the Roman Catholic Church was in favor of Stephen: that decision was rendered in the Council of Arles (314) and in that of Nice (325). He did much to relieve and strengthen his episcopate. Under him seven councils were held, the last in 256. In the reign of Valerian a new persecution of the Christians was decreed, and Cyprian being arrested and brought before the pro-consul refused to sacrifice to the gods and was banished and finally beheaded 14 Sept. 258. His day in the Roman calendar is 16 September, which day he shares with Pope Saint Cornelius. His writings include 'Unity of the Church'; 'Dress of Virgins'; 'Lapsed'; the 'Lord's Prayer'; the 'Vanity of Idols'; 'Against the Jews.' His works have been edited by Hartel, G., (3 vols., Vienna 1868–71); there is an English translation (in 'Ante-Nicene Fathers', Vol. V, Buffalo 1886–96). Consult Harnack, A., 'Drei wenig beachtete cyprianische Schriften und die Octa Pauli' (Leipzig 1899); Von Soden, 'Die cyprianische Briefsammlung' (id. 1904), and for his life, E. W. Benson (London and New York 1897); Faulkner (Cincinnati and New York 1906).

CYPRINE, bluish variety of vesuvianite, so called because the bluish tint is due to the presence of a small quantity of copper (*cuprum*, copper). The hue varies from pale blue to green according to the amount of copper present.

CYPRINDÆ, an extensive family of fresh-water, teleost fishes, distributed, in about 1,300 species, over the whole world except South America, Madagascar and Australasia. Most of the fresh-water fishes of the northern hemisphere belong to this family, and most of them are small, especially the American minnows, daces, chubs and shiners (qq.v.). Large examples are found in Europe and Asia, such as the carp, the Indian mahseer and catla, and a few others, described elsewhere by mane. See FISH.

CYPRINODONTIDÆ (Gr. "carp-toothed"), a family of fishes, order *Teleostea*, sub-order *Haplomi*. Although the dentition of the family resembles that of the carp the jaws are protractile, and the ventral fins, if present, have five to seven rays. The maxillaries do not enter into the formation of the mouth, the dorsal and anal fins lack spines, the scales are cycloid or have erect spines. The frontals meet the supraoccipital. *Fundulus* and *Anableps* (q.v.), the fish with eyes divided into portions for vision in air and for vision in water, are important genera.

CYPRIPEDIUM, a genus of plants of the family *Orchidaceæ*. The genus has about 40 species, 10 of them occurring in North America, and known generally as lady's-slippers. In medicine the term is applied to the rhizomes and rootlets of several species of *Cypripedium*. The root contains a volatile oil and tannic and gallic acids, and is used as a mild antispasmodic, for much the same purposes as valerian.

CYPRIS, a fresh-water crustacean, typical of the *Cypridæ*, of the order *Ostracoda*. It is sometimes called the water flea, and has an unsegmented body, seven pairs of appendages, a rudimentary abdomen and a bivalve shell enclosing all. The shell is dainty and elastic; the posterior antennæ bear a long tuft of bristles on their second joint; the second pair of maxillæ have a small gill-appendage; and the posterior limbs are very irregular. *C. pubera*, the largest form, measures about one-tenth of an inch. Some species, including *C. fusca* and *C. pubera*, reproduce by parthenogenesis in summer and autumn, the males being transient; while others, notably the *C. ovum*, the males are found throughout the year, and parthenogenesis seems not to occur. The eggs are usually laid in masses on stones and water-plants. The adults are said to be able to survive desiccation, and this is true of the eggs. Some species are very abundant as fossils in fresh-water strata.

CYPRUS, an island under British protectorate, lying south of Asia Minor, and the most eastern in the Mediterranean, near the mouth of the Bay or Gulf of Iskanderun. It is the third largest island in the Mediterranean, and, stretching from southwest to northeast, is about 148 miles long, with a width varying from 100 miles to 15 miles at a narrow peninsula in the north. Area 3,584 square miles. The main physical features of Cyprus consist of a range of mountains running along a large part of the northern coast, and a range parallel to it occupying a considerable part of the island on the south, with a broad tract of plain, called the Messaria, between, extending on either side to the sea. The second range culminates in Mount Troödos (6,406 feet). Cyprus is deficient in water, its streams being chiefly mountain torrents, which dry up in summer. The climate is in general healthy, excepting in various places during the heats of summer, which, causing a rapid evaporation, give rise to malarial fever. The forests were formerly very extensive, and in ancient times yielded wood much valued by the Phœnicians for ship-building, but owing to indiscriminate cutting, the depredations of goats, etc., they now cover a comparatively small area, with the result that the fertility of much of the soil has been impaired. The forests are now under government supervision, and eucalypti, pines and other trees are being planted. Although about one-third of the cultivable land is under cultivation, agriculture is in a rather backward state. The chief products in 1914 were: wheat, 1,937,000 bushels; barley, 1,965,000 bushels; vetches, 195,000 bushels; oats, 412,000 bushels. The cultivation of the vine and the production of wine is increasing, most of it being sent to Egypt and France. Much mischief is sometimes done by locusts, but measures have been taken, under the supervision of the government, by which their numbers have been greatly diminished in recent years. The extensive pasture lands of the island support numbers of sheep and goats. Cyprus possesses much mineral wealth, and in early times was celebrated for its copper, a metal the English name of which can be traced to that of this island. The copper is again being worked, as are also quarries of sandstone, marble, granite, limestone, etc. Salt in large quantities is obtained from works at Limasol and Larnaca. The sponge-fishery is of some importance. In addition to wine the chief articles of export are carobs, cotton, silk cocoons, cereals, raisins, skins, wool, cheese and fruits. The imports in 1914 were valued at £496,744, with exports of about the same value. Ships entered and cleared (1914) 581,926 tons. The revenue (1914–15) was £290,110 and expenditure £316,411. There were 628 elementary schools (1914–15) with a total enrolment of 36,661. A complete system of justice has been established. Roads and telegraphs have been constructed throughout the island, and there is a short railroad. Cables connect it with Syria and Egypt. About one-fourth of the people are Mohammedans, the rest are mostly members of the Greek Church.

The Phœnicians established themselves in Cyprus about 1100 or 1200 B.C. Greek colonists followed later; and for a time it was under Assyria. The Phœnicians introduced the worship of Astarte, which afterward passed into that of the Greek goddes Aphrodite (Venus). Amasis brought the island under the Egyptian yoke, 550 B.C. In 525 B.C. it was subdued by Cambyses and annexed to the Persian Empire, but it again became a dependency of Egypt under Ptolemy Soter toward the end of the

4th century B.C. In this condition it remained till the year 57 B.C., when it was made a Roman province. After the division of the Roman territories Cyprus continued subject to the Eastern Empire. In 1182 Isaac Comnenus, a prince of the imperial family of Constantinople, made himself independent, but the island was wrested from him in 1191, during the third Crusade, by Richard I of England, who afterward bestowed it upon Guy of Lusignan on condition of his renouncing his claim to the title of king of Jerusalem. After the extinction of the legitimate male line of Lusignan, James, an illegitimate descendant, became the ruler. His wife was a Venetian (Catharine Cornaro), and as she had no children, at his death the Venetians took advantage of this circumstance to make themselves masters of the island (1489). They enjoyed the undisturbed possession of it till 1571, when, in the reign of Selim II, notwithstanding a brave resistance on the part of Marco Antonio Bragadino, who defended Famagusta 11 months, it was conquered by the Turks and annexed to the Ottoman Empire. In 1830 it was taken by the viceroy of Egypt, but was retaken by the Turks in 1840, and retained by them till June 1878, when it was ceded to Great Britain by the Convention of Constantinople, concluded during the negotiations consequent on the Russo-Turkish War of 1877–78. It nominally formed a part of the Turkish dominions, the agreement being that it should be administered by Great Britain so long as Russia should retain possession of Batoum and Kars. Great Britain was also bound to pay a subsidy to the Porte, which amounts annually to £92,868. It was not paid directly, however, but retained as an offset to British claims against Turkey. This arrangement came to an end on 5 Nov. 1914, when, as a result of Turkey's entry into the Great European War on the side of the Central Powers, Great Britain annexed the island. Nearly a twelvemonth after, on 20 Oct. 1915, it was officially announced that, as an inducement for Greece to enter the war on the side of the Entente, Great Britain had offered to cede to her the island of Cyprus. This offer was, however, declined for the time being and accordingly it lapsed. The island is governed by a high commissioner, assisted by an executive council of six, and a legislative assembly of 18 members. Six of the last named are office-holders and 12 elective for a term of five years, three by the Mohammedan and nine by the non-Mohammedan population. The island is divided into six districts, each presided over by a commissioner, and each having a district court. In recent years a vast quantity of interesting archæological remains have been found in Cyprus. Pop. 274,108 (56,428 Ottoman Turks and 214,480 Christians of the Cypriote Church). The capital is Nicosia (pop. 16,052).

CYPSELIDÆ. See SWIFTS.

CYRANO DE BERGERAC, sē-rä'nō dẹ bärzh'rak, by Edmond Rostand, was first acted in Paris 28 Dec. 1897. The hero, always the central figure and usually the speaker, was a man of mark in his day (1620–55) as a gasconnading soldier, intrepid and indefatigable duellist, a facile poet, talented musician and writer of vivacious fancy. Report attributes to him an abnormally large nose, disfigured by sabre cuts. This nose is a mainspring of the action in Rostand's play. Cyrano twice talks of it at length. He loves his cousin, the précieuse Roxane. He feels that his deformity must render any suit of his hopeless if not impertinent, and makes it the task of his romantic self-abnegation to secure for Roxane the fulfilment of her love for Chrétien de Neuville and to defeat the evil designs on her of Count de Guiche and his complacent follower, M. de Valert. Roxane, the willing dupe of her affection, receives vows and verses inspired by Cyrano as Chrétien's, attributes the valor and magnanimity of one to the other, and discovers her error only years later as a widow at the bedside of the assassinated Cyrano, who is dying, as he has lived, in her service, and has her kiss «an unstained soldier's plume» as his late reward. The time of the action is 1640 and after; the scene at Paris and near Arras; the form Alexandrine verse of singular suppleness and polish, with lyrics attributed to Cyrano and reproducing admirably the temper of his time. It was Rostand's fourth play, his first notable success. Thanks in large part to the genius of the actor Coquelin the performance became a triumph historical in the annals of the Comédie Française. There had been no such enthusiasm there since the famous Night of Hernani (1830). The play was speedily translated into many tongues and acted in many lands with success, notably in America. Among many editions may be noted that with an introduction by Cohn, A. (New York 1899). There is a translation by Dole, Helen P. (New York 1899). Consult James, H. (in *Cornhill Magazine*, Vol. LXXXIV, p. 477 f). For the historical background see Platow, 'Die Personen von Rostand's Cyrano de Bergerac in der Geschichte und in der Dichtung' (Berlin 1902); and for analysis of the character of Cyrano, Schmidt, Erich, 'Charakteristiken' (2d series, Berlin 1901).

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CYRENAICA, sĭr-ē-nā'ĭ-ka, anciently a Greek state in the north of Africa, between Marmarica on the east and the Regio Syrtica on the west, and extending in its widest limits from the Philænorum Aræ at the bottom of the great Syrties to the Chersonesus Magna or north headland of the Gulf of Platea, or even to the Catabathmus Magnus, but the part possessed and cultivated by the Greek colonists actually occupied no more than the elevated district in the north, now called Jebel Akdar, along with the adjacent coast. It comprised five cities (Pentapolis) — (1) Hesperides-Berenice (Bengazi); (2) Barca (Merj); (3) Cyrene (Ain Shahat-Grenna); (4) Apollonia (Marsa Susa); (5) Teucheira-Arsinoë (Tocra). In later times two more important towns were added, Ptolemais (Tolmeita) and Darnis-Zarine (Derna). During the most flourishing period of the history of the city of Cyrene that town held in nominal subjection the whole of Cyrenaica, or the country lying between Carthage on the west, Egypt on the east and Phazania (Fessan) on the south, with the Mediterranean for its northern boundary. Cyrenaica remained independent at first as a monarchy under a dynasty of kings, the successors of Battus (the Libyan title of the kings of Cyrene; the actual name of the founder seems to have been Aristoteles), who led the first colony to Cyrene; afterward as a republic, until it was subdued by

Ptolemy, the son of Lagus, and annexed to Egypt 321 or 322 B.C. By the will of the last king of Cyrenaica belonging to the Ptolemaic dynasty, it was left to the Romans, 95 B.C., who, about 20 years later, erected it along with Crete into a Roman province. Under Constantine it was separated from Crete and made a province by itself. Under Diocletian, Cyrenaica was separated from Crete and made a distinct province under the name of Libya Superior. As the Roman Empire declined the attacks of the native Libyan tribes became more frequent and formidable, and the sufferings caused by their inroads and by plagues, earthquakes and locusts reduced the population and enterprise considerably. The country became overrun by the Arabs eventually and was under Ottoman rule. It is at present, however, not used to the best of its capacity and resources. Together with Tripoli it was annexed to Italy in November 1911 and formed into one province (August 1915), bounded on the west by Tunis and Algeria, on the east by Egypt and on the south and southeast by the Sahara. The estimated area is about 400,000 square miles and the population about 1,000,000, mostly Berbers and Jews. The province consists of Tripolitania (capital Tripoli; pop. 73,000) and Cyrenaica (capital Bengazi; pop. 35,000). Through these cities practically all of the trade passes. The chief exports are esparto fibre, skins and hides, ostrich feathers and sponges. Each district has its governor, appointed by the king on the nomination of the Minister of Colonies in accord with the Minister of War. These governors hold the rank of lieutenant-generals. (See Cyrene). Consult Gottschick, A. F., ‘Geschichte der Gründung und Blüte der hellenischen Staates in Kyrenaika’ (1858); Hildebrand, G., ‘Cyrenaika’ (1904); Haimann, ‘La Cirenaica’ (1882); Beechey, F. W., ‘Proceedings of Expedition to Explore North Coast of Africa’ (1828).

CYRENAICS, or CYRENIANS, a sect of ancient philosophers, whose founder was a disciple of Socrates, being Aristippus, a native of Cyrene, in Africa, after which city his followers were called. His great maxim was, that a man ought to control circumstances and not be controlled by them. He held that the sum of life was made up of pleasure and pain; the one to be sought after as good, the other to be avoided as evil. The chief good then, was the greatest number of agreeable perceptions; and the true philosopher the man who actively and successively pursued pleasure. Every act was regarded as morally indifferent, and only to be viewed as it produced pleasure or pain to the individual. The chief successors of Aristippus were Theodorus, Hegesias and Anniceris, each of whom became the founder of a sect known respectively as the Theodoran, Hegesian and Annicerian schools. Hegesias taught that pleasure is not obtainable in life, and recommended death. As cynicism was the forerunner of stoicism, so cyrenaicism paved the way for epicureanism, which constitutes its chief merit. (See Ethics; Hedonism; Utilitarianism). Consult Watson, ‘Hedonistic Theories from Aristippus to Spencer’ (Glasgow 1895).

CYRENE, sī-rē'nē, in Greek mythology, the daughter of Peneus, who was carried by her lover, Apollo, into Africa and gave name to that part of Cyrenaica (q.v.). By Apollo she became the mother of Aristæus.

CYRENE, in ancient times a celebrated city and the capital of Cyrenaica, in Africa, about 10 miles from the north coast, founded by Battus and a body of Dorian colonists, 631 B.C. The Battiadæ were driven out in 450 B.C. and varying forms of government succeeded, both republican and tyrannical. Alexander received its submission in 331 B.C., but it soon afterward fell under the sway of the Ptolemies. Its commerce with Egypt and Greece was extensive in classical times. Explorations and excavations were made in 1821–22 and in 1861. In 1910 the Archæological Institute of America began excavations at Cyrene. Numerous interesting remains have been discovered here, including a bath, two temples (supposed to be of the Roman period), and a magnificent necropolis, containing grottoes, façades and monuments of various kinds. In one of the grottoes are several curious paintings. A group of Ptolemiac buildings, 3,000 terra cottas, fine sculptures, an acropolis, Greek and Roman walls were discovered by the American expedition, whose work was suspended because of the Italo-Turkish War. Cyrene was the birthplace of Aristippus, Carneades the philosopher, Eratosthenes and Callimachus the grammarian. (See Cyrenaica). Consult Smith and Porcher, ‘Discoveries in Cyrene’ (London 1864); Barth, ‘Wanderungen durch die Küstenländer des Mittelmeers’ (1849); Hamilton, ‘Wanderings in North Africa’ (1851); ‘Bulletin of the Archæological Institute of America’ (II, 1910); Robinson, ‘Inscriptions from the Cyrenaica’ (in *American Journal of Archæology,* 2d series, Vol. XVII, 1913).

CYRIACUS, or CIRIACO DE' PIZZICOLLI, Italian antiquarian: b. Ancona 1391; d. about 1449. He had a passion for travel and to gratify it engaged in the life of a merchant. He became an ardent student of the classics and on his travels engaged in the study of the monuments and remains of the past. He visited Egypt, Greece, the Ægean Islands, everywhere purchasing manuscripts, coins and objects of art and copying inscriptions and describing walls, buildings and other evidences of the classic past. His collections were scattered soon after his death and but fragments of his notes and drawings remain. He was not thoroughly learned and made many mistakes, but his zeal was unsparing and to him we owe our knowledge of many monuments which have since disappeared. Consult Jahn, “Cyriacus von Ancona und Albrecht Dürer,” (in ‘Aus der Altertumswissenschaft,’ Bonn 1868), and Sandys, ‘History of Classical Scholarship’ (Vol. II, Cambridge 1908).

CYRIL, sĭr'ĭl, **Saint,** patriarch of Alexandria, and one of the fathers of the Church: b. Alexandria 376; d. there, June 444. He was educated in the desert 65 miles south of Alexandria by the Cenobitic monks of Nitria. He was patriarch of Alexandria from 412, when he succeeded his uncle Theophilus in that station, till his death. He was a very zealous champion of orthodoxy and a fiery adversary of Nestorius, Eutyches and all the heresiarchs and heresies of his time. So intemperate was his zeal for orthodoxy and for the extermination of dissent from the creed of Nicæa, Chalcedon and Constantinople, that it has brought down upon him the animadversion of some modern Church historians and has given material for historical novels in which imagination fills in what was lacking in the portrait of Saint Cyril drawn by his contemporary adversaries. Among modern Protestant writers Dean Milman in his 'History of Latin Christianity' presses against him charges of barbarity, persecution and bloodshed, on account of which Cyril, though styled saint, must be esteemed «one of the worst heretics against the spirit of the gospel.» He is charged with having closed the churches of the Novations and seized their church property; with having with an armed rabble wrecked the synagogues and driven the Jews in thousands out of the city; with having excited such tumults that the authority of the governor of Egypt, Orestes, was for a time defied. The murder of the illustrious Hypatia, neo-platonist philosopher and adversary of the Christian Church, is not alleged to have been instigated by him, but it is regarded as the inevitable sequel to his violent acts and speeches; and the perpetrators of it were, it is alleged on the authority of contemporaries, «officers of his Church.» It is further charged that he was attended at Ephesus, on the occasion of the council of the Church held there in 431, by a rabble of followers, presumably to overawe the fathers over whom he himself presided: in that council he procured the condemnation of Nestorius, followed by deprivation and banishment by the emperor. The works of Cyril, in the edition published at Paris in 1638 (7 vols.), consist of commentaries, treatises, homilies and epistles. Critical editions of certain of his works have appeared, among them his commentaries on Luke (1859); John (1872); 'Minor Prophets' (1868); 'Five Tomes Against Nestorius' (1881); 'Scholia on the Incarnation' (London 1907). Cyril holds high rank among the Church fathers as a theologian. Consult the biography by Kopallik (Mayence 1881).

CYRIL OF JERUSALEM, Saint, Greek father of the Church: b. Jerusalem about 315; d. there, 18 March 386. After his ordination to the priesthood in 345 his special office was to instruct the catechumens, both those who were to be prepared for admission to the Christian communion through baptism and those who after baptism were to be inducted into knowledge of the mysteries of the Christian religion, especially the mystery of the Eucharist. This occupation led to his writing his book of 'Catecheses,' one of the most interesting monuments of the ecclesiastical literature of that time. He was made bishop of Jerusalem in 350. Twice he was deposed and sent into exile by imperial decree because of his unflinching zeal for the creed of Nicæa as against the Arian party, first in the reign of Constantine II and then in that of Valens. On the accession of Theodosius in 379, he was restored to his see and there remained till his death. At the Ecumenical Council of Constantinople (381) he was received with acclamations by the fathers as a confessor of the faith who had gladly suffered persecution for the truth's sake. His 'Catecheses,' or catechetical lectures, are 23 in number, of which 18 are for the instruction of catechumens in the stage of preparation for baptism, while the remaining five, called the 'Catecheses Mystagogicæ,' treat, as their title imports, of the mysteries of the Christian religion. The work, translated into English, is one of the volumes of the Oxford 'Library of the Fathers.' Consult the edition of Cyril's works published by A. A. Touttée (Paris 1720; Venice 1761), reprinted in Migne, 'Patrologia Græca' (Vol. XXXIII), and by G. C. Reischl and J. Rupp (2 vols., Munich 1848–60; Eng. trans. by E. Gifford in 'The Nicene and Post-Nicene Fathers' (New York 1894). For his biography, Delacroix, 'Saint Cyrille de Jérusalem, sa vie et ses œuvres' (Paris 1865), and Mader, 'Der heiligen Cyrillus' (Einsiedeln 1901).

CYRILLA, a genus of shrubs consisting of one variable species, *C. racemiflora*, of the natural order *Cyrillaceæ*. The shrubs are found from the Carolinas westward to Texas and southward to Brazil. They are almost evergreen, and have attractive bright green leaves and white flowers in racemes. Popularly they are known as leatherwood and are sometimes seen in ornamental plantings as far north as New York, which is about the limit of their hardiness. They succeed best in moist, sandy soil and partial shade.

CYRILLIC ALPHABET, the story of whose invention by Cyril (820–69), apostle to the Slavs, whether true or false, forms an interesting episode in ecclesiastical annals, is still a debatable form of letters as to its precise origin and history. Its reputed inventor was originally a monk called Constantine, who with his brother Methodius led in Thessalonica an ascetic life, when in 860 he was sent to the Chazars, a Tartar tribe on the northern shores of the Black Sea. His work was to counteract Jewish and Mohammedan influences on the people. After a partial success, he returned to Constantinople, living as before with his brother, until sent by the emperor as a missionary among the South Slavic tribes, which had been subjected to Roman and Greek propaganda. In his labors among them he founded a Slavic literature by translating into their language portions of the Scriptures and important liturgical books. For this purpose he is said to have invented a new form of alphabet or to have modified the more ancient Glagolitic, which received the name Cyrillic, and was adopted by most of the Eastern Slavs, Bulgarian, Bosnian, Russian, Serbian, etc. It was, however, subsequently modified in various ways in those countries. Succeeding also in Slavic lands outside of the Greek Empire, he and his brother were called to Rome by Nicholas I (868) whose successor approved their work and wished them to organize independent new churches in the Slav provinces. But Constantine, assuming the name of Cyril, preferred to remain in Rome as a simple monk and died a year later. Methodius continued his efforts until his death in 885.

In reference to the Cyrillic alphabet, a Bulgarian monk of the next generation in 855 mentions Cyril as author, and gives 38 as the number of its letters which were later increased to 48. Twenty-four are identical with Greek uncials of the 8th and 9th century. Additional characters were required to express the many Slavic vowels, sibilants and nasals, whose origin is hard to explain. Cyril incorporated Glagolitic characters, mostly signifying Slavonic words — the Glagolitic (from *glagol*, a word,) becoming of minor account, while the Cyrillic has developed into one of the three dominant alphabets of the world, to use Isaac Taylor's expression. While the phonetic basis of the language is nearer some Bulgarian dialects, German and Latin words were included in Moravia, which appear to have modified the vocabulary. The three alphabets of the Slavonians express their religious dependence: Latin was adopted for those who held Latin services; Cyrillic, the Greek uncial, was used by orthodox Slavs for their liturgy; Glagolitic survives in the Dalmatian liturgy and in Montenegro, the Roman Church permitting its employment. A modern version of the Cyrillic was made for Russia by Peter the Great. The earliest dated Slavonic writing is a Cyrillic inscription of Tsar Samuel of Bulgaria (996). It is the theory of Brückner that Cyril invented Cyrillic first, but «degraded» it into Glagolitic to conceal its Greek origin from the Latin clergy, as the entire purpose of his mission was hostility to Rome; in orthodox lands, such caution was not necessary.

Bibliography.— d'Avril, A., ‘S. Cyrille et S. Method’ (Paris 1885); Bonwertsch, N., ‘Cyrill. und Method.’ (Erlangen 1885); Brückner, A., ‘Thesen zur Cyrillo-Methodian. Frage’ (in *Arch. f. sl. Phil.* XXVII, 1906); Dobrowsky, ‘Cyrill und Method.’ (Prague 1823); Franks, J., (in *Arch. f. sl. Phil.* XXVIII); Goetz, ‘Gesch. d. Slavenapostel C. und M.’ (Gotha 1907); Taylor, Isaac, ‘The Alphabet’ (II, London 1883).

A. S. Isaacs.

CYRILLUS and METHODIUS, apostles of the Slavs. They were brothers and natives of Thessalonica. Cyril was the name adopted as a monk by Constantine, b. 827. For his learning he was surnamed «the philosopher.» The Khasars, a Tartar people, having about the year 860 asked the Emperor Michael III to send them Christian missionaries, Cyril was sent and made many converts. The Bulgarians of Thrace and Mœsia were evangelized by Methodius, who baptized their king, Bogoris, in 861. At the request of Ratislav, Duke of Moravia, the brothers then turned to the countries on the March and Danube. They prepared a Slav translation of the Scriptures and chief liturgical books (which became the foundation of the literature of the Slavs), and by their services in the mother-tongue won the hearts of the people from the Roman missionaries. The two brothers were summoned to Rome to explain their conduct in conducting services in the vernacular, and Cyril died there in 869. Methodius, who in the same year was consecrated bishop of the Moravians, completed the evangelization of the Slavs. Called to Rome in 879 to justify his celebration of the mass in the native tongue, he succeeded in gaining the approval of Pope John VIII, and (according to most probable account) died Hradisch on the March, 6 April 885. Bohemia and Moravia celebrated the millenary festival of their two apostles on 5 July 1863. Both brothers are recognized as saints by the Roman Catholic Church. Their festival falls in the Roman Catholic Church on 9 March; in the Greek Church 11 May. The Cyrillic alphabet modified out of the Greek by Cyril, superseded the more ancient Slavonic alphabet over a wide area. The history of Cyril and Methodius is still very obscure. Consult Bondwetsch, N., ‘Cyril and Method’ (Erlangen 1885); Ginzel, ‘Geschichte der Slawenapostel Cyril und Method’ (Vienna 1857); Dümmler and Miklosich, ‘Die Legende vom Heiligen Cyril’ (ib. 1870); Goetz, ‘Geschichte der Slawenapostel Constantinus (Cyrillus) and Methodius’ (Gotha 1897); Miklosich (ed.), ‘Vita Sancti Methodii’ (Vienna 1870); Maclear, ‘Conversion of the Slavs’ (London 1879); ‘Acta Sanctorum,’ edited by J. Boland (March, II, pp. 12–25, October, XI, pp. 168–171) contains some original sources.

CYRUS THE GREAT, king of Persia: b. about 600; d. 529 B.C. The ancient original authorities for the facts of his life are Herodotus and Ctesias, but their accounts are interspersed with many highly colored legends. His lineage we have from a famous cuneiform cylinder prepared under his own authority. It is now in the British Museum. In it Cyrus establishes his royal claim through his father, Cambyses, back to Teispes, the son of Achæmenes and founder of Achæmenian dynasty. The ancestral home was Anzan, supposed to be a district of Elam. It is, however, certain that Cyrus was a Persian. According to Herodotus he was the son of Cambyses, a distinguished Persian, and of Mandane, daughter of the Median king Astyages. He founded the Persian monarchy. A short time before his birth the soothsayers at the court of Astyages divined from a dream of his that his future grandson was to dethrone him. Upon this he gave orders that Cyrus should be destroyed immediately after his birth. For this purpose he was delivered to a herdsman, who, moved with compassion, brought him up, and named him Cyrus. His courage and spirit betrayed his descent to the king. The Magi having succeeded in quieting the uneasiness which the discovery occasioned him, he sent Cyrus to his parents in Persia, with marks of his favor. Whether this legend is true or not, it is certain that the beginning of Cyrus's career was the conquest of his grandfather about 559 B.C. by which he became king of Media and Persia. In 546 he conquered Crœsus, the rich and powerful king of Lydia, and in 539 took Babylon, which did not offer much resistance, being torn by internal dissensions. He also subdued Phœnicia and Palestine, to which he caused the Jews to return from the Babylonish captivity. While Asia, from the Hellespont to the Indies, was under his dominion, he engaged in a war against the Massagetæ — a people of Scythia, northeast of the Caspian Sea, beyond the Araxes, then ruled by a queen named Tomyris. In the first battle he conquered by stratagem, but in the second was defeated, and was himself slain (529 B.C.). The stories related by Xenophon in the ‘Cyropædia’ (professing to be an account of the life and character of Cyrus), that he received a splendid education at the court of Astyages, inherited his kingdom and ruled like a genuine philosopher, are mere romance, Xenophon's design being to represent the model of a king, without regard to historical truth, and in this way perhaps to exhibit to his countrymen the advantages of a monarchy. The chief points in which the account of Ctesias differs from that of Herodotus are that Ctesias does not make Cyrus any relation of Astyages, that after the conquest of Media

Cyrus married Amytis, the daughter of Astyages, and honored the latter as a father, and that he met his death in a battle with a nation called the Derbices, who were assisted by the Indians. Ctesias also mentions certain wars of Cyrus not related by Herodotus, and gives a somewhat different account of the war with Crœsus, king of Lydia. Within a few years Cyrus founded a mighty state, which proves that he must have been possessed of great gifts as a warrior and statesman. His nobility of character is shown by his treatment of the vanquished. He destroyed no town nor did he put the captive leaders to death. By the Persians his memory was cherished as "the father of the people," by the Jews he was considered their liberator, and his greatness as a ruler and legislator was acknowledged by the Greeks. His claim to be styled Cyrus the Great, as history has known him, is amply justified and remains unchallenged. He built a city and palace in his native district, which was called after his tribe Pasargadæ (now Murghab), and here his body was laid to rest. Consult Amiand, 'Cyrus, roi de Perse' (Paris 1887); Duncker, 'History of Antiquity' (English trans., London 1881); Geiger and Kuhn, 'Grundriss der iranischen Philogie' (Strassburg 1897); Horner, 'Daniel, Darius the Median, Cyrus the Great' (Pittsburgh 1901); Lessmann, 'Die Kyrossage in Europa' (Charlottenburg 1906).

CYRUS THE YOUNGER, King of Persia: b. about 424 B.C.; d. 401 B.C. He was the second son of Darius Nothus, or Ochus, and at 15 obtained the supreme power over all the provinces of Asia Minor. His ambition early displayed itself; and when, after his father's death (404 B.C), his elder brother, Artaxerxes Mnemon, ascended the throne, Cyrus formed a conspiracy against him, which was, however, discovered. Cyrus was arrested by his brother and condemned to death, but at the intercession of his mother Parysatis, was released and made governor of Asia Minor. Here Cyrus assembled a numerous army to make war upon Artaxerxes and dethrone him. Being informed of his brother's design, Artaxerxes marched against him with a much larger army. In the plains of Cunaxa, in the province of Babylon, the two armies encountered each other (401 B.C). In the battle that ensued the troops of Cyrus were at first victorious, but the fruits of the victory were lost through the death of Cyrus himself in the battle. An account of the life of Cyrus is contained in the opening book of Xenophon's 'Anabasis,' which gives a detailed account of the retreat of the Greek auxiliaries of Cyrus from the interior of Persia to the coast of the Black Sea. Another account by Ephorus is preserved in Diodorus. Excerpts from Ctesias by Photius also throw light on the career of Cyrus, as also the life of Artaxerxes by Plutarch. The character of Cyrus is highly praised by the ancients and it appears that he was certainly his brother's superior in energy and as a statesman and general. The fate of the empire would probably have been very different had he ascended the throne. See PERSIA.

CYSTADENOMA. See TUMOR, *Intermediate.*

CYSTICERCUS, sĭs-tĭ-sėr'kŭs, a larval stage of the tapeworm, sometimes found in the human body in the form of small-sized tumors and which may be distributed in a variety of situations. The tumors may range from the size of a pea to that of a hazelnut and may exist singly or may be multiple. They are found chiefly in the back and sides of the trunk, less frequently in the extremities and are sometimes subcutaneous. Occasionally they involve the brain and other organs, as the liver, kidneys, spleen, etc. Frequently they give rise to no symptoms whatever, but when occurring in an important organ of the body may cause major symptoms. In the flesh of many of the lower animals cysticerci also frequently occur, and it is by those present in the meat which he eats that tapeworms are largely communicated to man.

CYSTINURIA, a condition in which large amounts of cystin are found in the urine. It is a very rare condition and is usually associated with excessive intestinal putrefaction.. Sometimes cystin calculi result because of the excess of this acid in the urine.

CYSTITIS, an inflammation of the urinary bladder, usually resulting in pain and increased desire to urinate. The urine may be cloudy or bloody and there is usually an excess of mucus and pus found. The pain is situated over the pubic bone and may extend to the back, and there may be some associated fever with chills, if the inflammation is severe. Cystitis is most frequently due to an infection from without, usually the result of passing an unclean catheter. It may also result from urethritis and is a very common condition in old men in whom the prostate gland is enlarged. It may also result from the presence of a stone in the bladder. Treatment is often difficult, requiring skilled medical attendance; but sitz-baths and hot applications to the abdomen are of service, and abstinence from peppery or alcoholic foods is advisable. See BLADDER, DISEASES OF.

CYSTOIDEA, an order of extinct echinoderms. They are spheroidal animals, pedunculate or sessile, enclosed by polygonal calcareous plates. They have a mouth above; the arms are rudimentary. Buch first elucidated their structure and affinities in an essay published at Berlin, in 1845, and gave them the name of *Cystideæ* in place of *Sphæronites,* which was their original appellation. Now *Cystideæ* has become *Cystoidea.* They range from the upper Cambrian to the Silurian, being especially prominent in the Bala Limestone.

CYSTOPTERIS, bladder-fern, a genus of delicate flaccid polypodiaceous ferns. They are found in moist, cool localities. *C. fragilis* (the brittle fern) is found in this country, as is the very rare *C. montana.* The brittle fern has a wide range, being found within the Arctic circle to Chile, South Africa and Australasia. They have dot-like sori covered by hood-like indusia. *C. bulbifera,* which multiplies by bulblets, is found in the northern Appalachians.

CYSTS, circumscribed tumors containing more or less fluid substance, or occasional gases, cut off from the neighboring tissues by a distinct limiting wall. See TUMORS.

CYTASE, a ferment or enzyme that exerts a kind of digestive action upon the cell-walls of plants, rendering them soluble in water. It occurs in the hyphæ of certain parasitic fungi, and also in the germinating seeds of certain plants in which the reserve food-material is normally stored up in masses of stony hardness. It dissolves cellulose, but has no effect upon lignin, and is destroyed by exposure to a temperature of 150° F. The chemical nature of cytase is not yet established, and it may prove to be a mixture of several enzymes instead of a single substance of definite composition.

CYTHERE, sī-thē'rē, a genus of *Entomostraca,* order *Ostracoda,* family *Cytheridæ.* The eye is single, the inferior antennæ setigerous, but without a tuft or pencil of tiny filaments; three pairs of feet are enclosed within the shell, and no heart is present.

CYTHEREA, sĭ-thẹr'ē-ạ (from Cytherea, a name for Venus), a genus of conchiferous mollusks belonging to the family *Veneridæ.* The shell is like that of the genus *Venus.* There are three cardinal teeth and an anterior one beneath the tunicle. The cythereas are in all seas; about 176 recent species are known and 200 fossil, the latter ranging from the Oölite down.

CYTISINE, sĭt'ĭ-sĭn ($C_{20}H_{27}N_3O$). When the ripe seeds of laburnum are powdered, extracted with acidulated water, the fluid treated successively with lead acetate and tannic acid, and the precipitate, before it becomes resinous, mixed with lead oxide, then dried and exhausted with alcohol, crude cytisine is obtained on evaporation, and after proper purification it forms a brilliant crystalline mass. It is very soluble in water and alcohol, but insoluble in ether, benzol and chloroform, has a bitter taste, but no odor. It is a very powerful base, decomposing the salts of ammonia and the metals even in the cold. It combines with the strong acids, but the salts are all deliquescent except the nitrate, which crystallizes very readily in splendid, thick, transparent, colorless, monoclinic prisms. It can be sublimed without decomposition by careful heating in a current of hydrogen. The poisonous properties of laburnum are well known. The toxicological effects are due to this alkaloid, which in doses of from 0.1 to 0.5 of a grain is fatal in a few minutes to ordinary small animals.

CYTISUS, sĭt'ĭ-sŭs, a genus of low shrubs or small trees of the natural order *Leguminosæ.* There are about 40 species, natives mostly of Europe, western Asia and northern Africa. They are characterized by small, deciduous or evergreen trifoliate leaves, yellow, purple or white flowers in terminal or axillary racemes or heads, and few- to many-seeded pods. Several species with long twiggy branches are called broom; others are popularly known as laburnum and others by the genus name. A good many are cultivated for ornament either in shrubberies or in greenhouses, where some, especially *C. canariensis,* are known as genistas and are very popular about Easter time. In Europe several species are valued as forage plants, but in America they have not met the expectations of experimenters. The laburnum is poisonous. See BROOM; GENISTA; LABURNUM.

CYTODE, sī'tōd, a piece or bit of protoplasm, defined by Haeckel as without a nucleus In this respect it differs from a cell. The monera of Haeckel are cytodes which have not yet reached a cell stage. As yet no definite nucleus has been discovered in the bacteria or the cyanophyceæ, so that these seem to be cytodes.

CYTOLOGY, the science which deals with the structure, development and functions of the cell; of the multiplication of cells and of the relations of cells to organs and tissues. It is distinguished from histology in that histology deals with tissues, while cytology deals rather with the cells of which tissues are composed. A sharp distinction cannot be made between cytology and morphology, although in general it may be said that cytology is concerned more with individual cells than with organs. Cytology may be called "oil immersion" morphology because microscopes with very high magnifying powers are required for cytological studies. The terms, cytology and morphology, are used very indiscriminately by many botanists and zoologists. During the past 20 years, most botanical studies with such titles as "The Morphology of —," contain more or less cytology, while only a smaller number of articles purporting to be cytological are largely morphological. Among the problems which belong indisputably to cytology are the following: The origin, development, structure and functions of the cell and of its various constituents; nuclear and cell division; fertilization; organization of the embryo; the relation of the individual cell to cell complexes; the rôle of the cell in heredity. An idea of the subject matter of cytology can best be gained by examining, from the cytological standpoint, a few prominent subjects which are also studied by investigators in other fields. See EMBRYOLOGY; FERTILIZATION; HEREDITY; MUTATION.

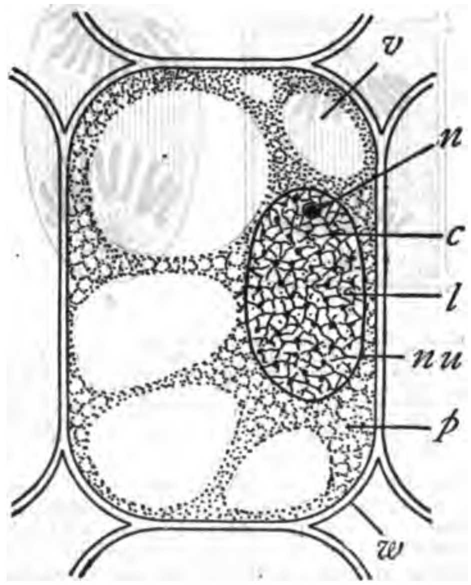

FIG. 1. — A cell illustrating the parts which are common to nearly all cells. Highly magnified. *v*, vacuole; *n*, nucleolus; *c*, chromatin; *l*, linin; *nu*, nucleus; *p*, protoplasm; *w*, cell wall.

The Cell.— A cell has been defined as "a mass of protoplasm with a nucleus in it." While this is true for many simple forms, there is in addition, in the vast majority of cases, a cell wall surrounding the protoplasm (Fig. 1).

Cells without nuclei were reported frequently about 40 years ago, but at present no animal cells without nuclei are known. Numerous cases of non-nucleate cells were reported by the older botanists, but as lenses and methods of preparation have improved, nuclei have been demonstrated until the only doubtful cases now known to the botanist are the bacteria. The blue-green algæ were long thought to have no nuclei, but nuclei have now been demonstrated in several genera and are doubtless present throughout the group.

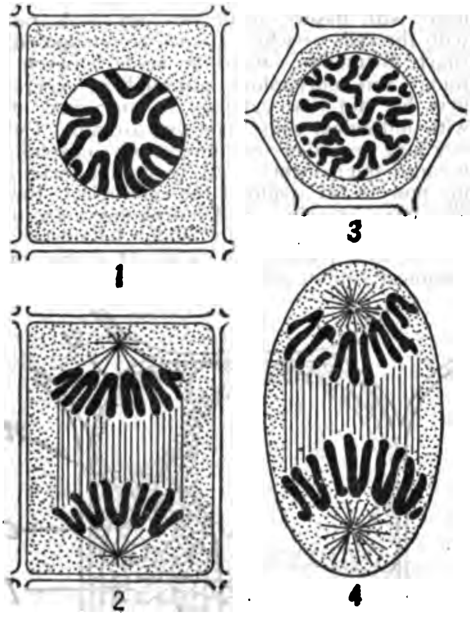

Fig. 2. — Cells undergoing nuclear division: 1 an early and 2 a later stage in the division of the nucleus in a cell of the root tip of the common *Onion*. 3 and 4, the corresponding stages in epidermal cells of the *Salamander*. In 2 and 4 the V-shaped chromosomes, which are regarded as the physical basis of heredity, are clearly seen. Highly magnified.

Most cells are too small to be seen without a microscope, cells which are visible to the naked eye being rather exceptional. The egg of a bird consists of a single cell, as do the eggs of all animals and plants. The largest plant cells are the internodal cells of the stonewort, *Chara*, which reach a length of two inches. The largest egg cell described for any plant is that of *Dioon*, a plant related to the sago palm; this cell reaches a length of about one-fourth of an inch.

The most usual shape of free cells is the spherical, and cells forming a part of a tissue are usually more or less rectangular in form.

When first formed, the cells of the individual animal or plant are very much alike, but as one examines cells farther and farther from the regions where active cell multiplication is taking place, it is seen that the originally similar cells are becoming very unlike. In the higher plants the outer cells become differentiated into protective tissue, the innermost into conductive tissue, others into assimilative tissue and still others become reproductive cells. In higher animals similar differentiations take place, cells which finally become so different, as those which form nerves, muscle, glands and even the teeth, having been practically alike in the beginning. Among the unicellular organisms there is often a remarkable differentiation and division of labor, the single cell performing the functions of locomotion, securing food, respiration, digestion, assimilation, etc. Such differentiation and the causes which lead to it are among the most important of cytological problems.

It is a remarkable fact that while undergoing nuclear division, the cells of animals and plants strikingly resemble one another, even in the behavior of the most minute constituents of the nucleus and protoplasm. (Fig. 2). This must mean that animals have been derived from plants or that structures of amazing similarity have arisen independently in animals and plants.

Fertilization.— One of the most important problems of cytology is the problem of fertilization and attendant phenomena. While new individuals, even in the more highly organized plants and animals, may arise occasionally without fertilization (by parthenogenesis, chemical stimulus, vegetable multiplication, etc.), such cases are so rare that fertilization is assumed to occur unless its absence is definitely established. To the cytologist, fertilization consists in the union of definitely organized male and female elements. The cytological details of fertilization are essentially alike in plants and animals. (Fig. 3). Fertilization, both in plants and in animals, is preceded by a reduction in the number of chromosomes, so that the number of chromosomes found in the male nucleus or in the female nucleus is just one-half the number which is found in the body cells of a given plant or animal. Consequently, when the two sexual nuclei fuse during fertilization, the number of chromosomes which characterizes the body cells is restored. The complicated details of the processes by which this reduction in the number of chromosomes is effected are essentially alike in animals and plants. The closing paragraphs of this article show that the chromosome contributions of the two parents are not quite so identical as stated above, and that the differences are effective in determining the sex of the offspring. Those cytologists who have investigated most thoroughly the phenomena of fertilization have come to the conclusion that heredity is referable to a definite cytological basis.

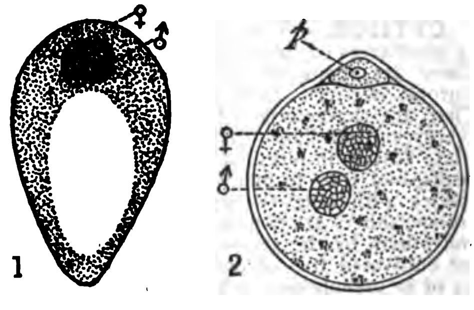

Fig. 3. — Fertilization. 1, the egg (oosphere) of a *Lily*, showing the male and female nuclei about to unite; 2, the egg of a *mouse* with the male and female nuclei about to unite; *p*, polar body. (2, after Sobotta.) Highly magnified

A Cytological View of Heredity.— Almost without exception, cytologists believe that chromatin is the physical basis of heredity. The reasons for this belief are, briefly, as follows: The male and female parents are equally potent in transmitting characters to offspring; an equal amount of chromatin and an equal number of chromosomes are contributed by each parent; nothing but chromatin is contributed equally by the two parents. (Fig. 4). There is usually a great difference in size between the male and female germ cells. The sperm cell (spermatozoan) of the ostrich is almost invisible to the naked eye, while the egg is as large as a coconut, and such differences in size are usual both in plants and animals. The egg contains a large amount of protoplasm and various foodstuffs, while the male cell contains very little protoplasm or foodstuffs and in many cases even that little is left outside at the time of fertilization, only the nucleus entering the egg. Hence, protoplasm and foodstuffs do not transmit hereditary characters. While the male nucleus is usually the smaller at the time of its entrance into the egg, it increases in size so that, at the time of fusion, the sex nuclei are alike in size. (See Fig. 3). Investigators of this subject are usually tempted into speculative philosophy. Philosophizing over the facts is commendable, but the wild philosophizing in advance of the facts which has attended this subject has been of little value, except as it has stimulated investigation.

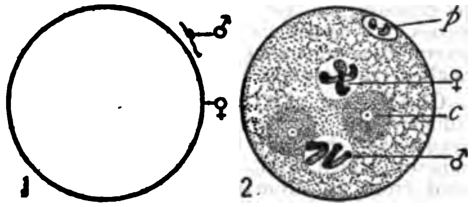

FIG. 4.—1, The egg and sperm of *Fucus*, showing great inequality in size; 2, fertilization in a *worm* (*Ascaris*) showing the equal contribution of chromatin, each parent contributing two chromosomes. *p*, polar body; *c*, centrosome. (2 after BOVERI.) Highly magnified.

The organization of embryos and mature organisms from eggs is a cytological problem which has not yet been solved. The visible stages in development have been observed and described *ad infinitum*. Both experimental cytology dealing largely with living material, and anatomical studies of thin sections, stained so as to show the most minute details of structure, are contributing to the solution of the problem, but the fundamental causes underlying the phenomena are still unknown and seem as difficult of solution as the problem of the origin of life. The eggs of the sunflower and the willow, like the eggs of all flowering plants, are too small to be examined with the naked eye, but even when examined with the aid of modern technique and the most powerful microscopes, they present no essential differences in external appearance or internal structure, and yet one always develops into a sunflower, and the other into a willow. Within the fertilized egg are all the potentialities of the adult, even to the color of the flower or the markings on the wings of the butterfly. Some have believed that each part of the adult comes from a certain predetermined part of the fertilized egg. This is called the theory of germinal localization. Others have made experiments to show that this theory is not true. Most botanists and zoologists accept, as a working hypothesis, that chromatin is the physical basis of heredity, an hypothesis which assumes that there is no prelocalization in the protoplasm of the egg. The problem of organization is so bound up with that of heredity that much of the literature of the subject will be found in treatises on heredity.

At present, the determination of sex is receiving a great deal of attention from students of both animal and plant cytology. In various animals it has been shown that the chromosome contributions of the two parents are not identical. In the grasshopper, all the eggs have six chromosomes; but, in the male, two of the four sperms developed from each sperm-mother-cell have six cromosomes and the other two have only five. Eggs fertilized by sperms containing six chromosomes produce females, while those fertilized by sperms with only five chromosomes produce males. Similar results have been recorded for other animals. The problem in plants is much more difficult because the separation of the sexes is not so prevalent and because cases are rare in which the four sperms formed from one mother-cell remain together for any length of time. However, some progress is being made and it seems probable that differences in the chromosome contributions of the two parents are responsible for the determination of sex in plants.

If these conclusions are well founded, no amount of feeding or fasting on the part of the female could affect the sex of the offspring in animals; and culture media applied to the female would be equally futile in plants.

It has become increasingly evident that not only spermatogenesis, oogenesis, fertilization and development of the embryo, are cell problems; but also that mutation, Mendelism genetics and other phases of the great problem of heredity must find their basis in the individual cell. Plant physiologists are also turning more and more to the individual cell as the unit of physiological activity.

Bibliography.— Cytology is too recent a subject to have given rise to many textbooks, most of the literature being in the form of articles in leading botanical and zoological journals. Probably the most important book on the subject is Prof. E. B. Wilson's 'The Cell in Development and Inheritance.' The following headings of chapters in Professor Wilson's treatise indicate quite accurately the subject matter of cytology as presented in the few universities which offer courses in this subject: (1) General sketch of the cell; (2) Cell division; (3) The germ cells; (4) Fertilization of the ovum; (5) Reduction of chromosomes, oogenesis and spermatogenesis; (6) Some problems of cell organization; (7) Some aspects of cell chemistry and cell physiology; (8) Cell division and development; (9) Theories of inheritance and development. This book contains a very complete bibliography. Other books on the subject are Hertwig's 'The Cell' and Häcker's 'Praxis und Theorie der Zellen-und Befruchtungslehre.' All volumes cited above are by zoologists; no similar books have been written by botanists. A part of the subject is covered by Professor Strasburger's book on 'Reduktionstheilung, Spindelbildung, Centrosomen, und Cilienbildner im Pflanzenreich.' 'Zellen-und Gewebelehre,' by the same author, published in 1913 as the second volume of the fourth part of the third section of 'Kultur der Gegenwart,' is the latest authoritative treatment of plant cytology. The chief scientific journals in which the great majority of cytological investigations are published are (Botanical), *Annals of Botany, Botanical Gazette, Jahrbücher für wissenschaftliche Botanik, Berichte der Deutschen Botanischen Gesellschaft, Flora,* and *Annals des Science Naturelles Botanique,* (Zoological), *Journal of Morphology, La Cellule, Anatomische Anzeiger, Archives de Biologie, Sitzungsbericht der Gesellschaft für Morphologie und Physiologie München,* and *Bulletin Acad. Roy. de Belgique.*

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CYTOPLASM, the protoplasmic contents of the cell outside of the nucleus. See Cell; Cytology.

CYZICUS, Asia Minor, a peninsula 70 miles southwest of Constantinople. It projects into the Sea of Marmora, and is connected with the mainland by a narrow isthmus, but was once an island and the site of the ancient town of same name, which stood on its south extremity, and of which some remains, including a fine amphitheatre and the foundation of a splendid temple of Hadrian, are still seen. The peninsula, which stretches east to west for 18 miles, with a breadth of about 9 miles, is very beautiful and picturesque. Its mountains, called by the Turks Kafu-Dagh, rise to a height of about 2,500 feet. Consult Hasluck, 'Cyzicus' (Cambridge 1913).

CZACKI, chät'skē, **Tadeusz,** Count, Polish statesman: b. Poryck, Volhynia, 1765; d. 1813. In early youth he was employed in the Superior Court of Justice at Warsaw and in 1788 he was appointed to the Treasury Commission of the Diet. He was deeply interested in the economic and educational development of Poland, and to this end traveled throughout the country, inspecting and mapping its river system. On the second partition of Poland his property was confiscated and he taught for a time at Cracow. Paul I restored him his estates and for the rest of Czacki's life he devoted himself to the extension of education among his countrymen. Alexander I looked with favor on his efforts and appointed him inspector of schools in Volhynia, Padolia and Kiev. Of his own resources he gave over 500,000 thalers to the cause of education, and also donated a library of 4,000 manuscripts, 12,000 works in Polish and 80,000 miscellaneous works. He founded the famous Gymnasium of Kremenetz, long the intellectual centre of Poland. In 1807 Count Czacki was accused of stirring up political discontent among his countrymen, but he ably defended himself before Alexander I, who appointed him deputy curator of public instruction in Russian Poland. His works, mainly archæological and historical, were published in three volumes (Posen 1843). His most important work is 'On Lithuanian and Polish Laws' (2 vols., Warsaw 1800; 3d ed., Cracow 1861).

CZAJKOWSKI, chī-kov'skē, **Michal,** Polish novelist: b. near Berditchev, in the Ukraine, 1808; d. 1886. In 1831 he was obliged to flee to Paris because of his participation in an insurrection against Russia. A number of Polish exiles sent him on a secret mission to Turkey in 1840 and he embraced the faith of Islam in 1851. He became commander of a body of troops known as the Cossacks of the Sultan and fought with distinction against the Russians in 1853–54. He returned to Russia in 1873 under a decree of amnesty. An accusation of treason was made against him in 1886 and in consequence he committed suicide. His stories of Cossack life were very popular, and several have appeared in German, French and English translations.

CZAR, zär, **ZAR,** or **TSAR,** tsär, the ordinary title of the emperors of Russia, derived from the Old Slavonic *cesar,* king or emperor, which, although long held to be derived from the Roman title *Cæsar,* is almost certainly of Tatar origin and is a survival of Asiatic dominion in Russia, as may be judged from the fact that there were czars of Georgia and other khanates, evidence of the non-imperial content of the term. In the beginning of the 10th century the Bulgarian prince Symeon assumed this title, which remained attached to the Bulgarian crown. In 1346 it was adopted by Stephen Duschan, king of Serbia. Among the Russians the Byzantine emperors were so called, as were also the khans of the Mongols that ruled in Russia. Ivan III, grand prince of Moscow, held the title, and Ivan IV caused himself to be crowned as czar in 1547. With the conquest of Little Russia and Smolensk the rulers of Russia assumed the title of Czar of All the Russias. In 1721 the Senate and clergy conferred on Peter I, in the name of the nation, the title Emperor of Russia, for which in Russia the Latin word *imperator* is used. But among the Russians the common designation of the emperor is czar, or, as it is more properly spelled, tsar. See Russia.

CZARNEKI, or **CZARNIEKI,** chär-nets'kē, **Stefan,** Polish general: b. 1599; d. 1665. He fought brilliantly in the war against Charles X of Sweden in 1655–60, and was hailed as the liberator of his country. In 1660–61 he defeated the Cossacks in two great battles. He went on an expedition to the Crimea, seeking an alliance with the Tatars, but died as the result of fatigue and exposure incurred on the journey.

CZARTORYSKI, chär-tŏ-rĭ'skē, **Adam George,** Prince, Polish statesman and patriot: b. Warsaw, 14 Jan. 1770; d. Paris, 16 July 1861. He was the son of Prince Adam Casimir Czartoryski, the head of an ancient Polish house. His education was completed at the University of Edinburgh and in London. After the partition of his country in 1795 he was sent as a hostage to Saint Petersburg. There he formed a close friendship with Prince Alexander, who on his elevation to the throne appointed him assistant to the Minister of Foreign Affairs and curator of all the educational establishments in Poland. On 11 April 1805 he signed in name of Russia the Treaty of Alliance with Great Britain. While curator of the University of Vilna he used his influence to keep alive a spirit of nationality among the Poles, and when some of the students were arrested for sedition and sent to Siberia, he resigned his office. On the outbreak of the Polish revolution of 1830 he showed himself active on behalf of his country, and was chosen president of the provisional government (18 December). On 30 Jan. 1831 he became the head of the national government, and gave up the half of his property to the service of his country. On the appointment of Krukowiecki to the dictatorship Czartoryski resigned his post as president of the Senate. In the last days of the struggle for freedom he served as a common soldier in the corps of General Romarino. Thenceforth he lived at Paris, ceaselessly engaged in aiding his needy fellow-countrymen. He was excluded from the amnesty of 1831, and his estates in Poland were confiscated. In 1848 he liberated all the serfs on his estates in Galicia, and during the Crimean War endeavored to induce England and France to identify the cause of Poland with that of Turkey. Alexander II offered him an amnesty which he refused. Consult his 'Mémoires et correspondance avec l'empereur Alexander Premier' (Paris 1887; Eng. trans., London 1888); Morfill, 'Story of Poland' (ib., 1893); Załeski, 'Life of Adam Czartoryski' (Paris 1881); Gadon, 'Prince Adam Czartoryski' (Cracow 1900). See POLAND.

CZASLAU, chäs'low, Bohemia. (1) Town, capital of a circle or district of the same name; located in a fertile plain, 45 miles east-southeast of Prague; and is memorable for the defeat which the Austrians sustained from Frederick the Great in 1742. The church Saint Peter and Saint Paul has the loftiest steeple in Bohemia, and contains the remains of the celebrated Hussite leader, John Ziska. Alcohol, beer, beet sugar and pressed yeast are the principal manufactures. Pop. 9,122; mostly Czechs. (2) The circle or district is well wooded and fertile, yielding excellent crops of corn and flax; and large quantities of minerals, especially iron. Area, 233 square miles. Pop. 61,064.

CZECH LANGUAGE. See BOHEMIAN LANGUAGE.

CZECH LITERATURE. The uncontested earliest document in the Czech language dates from the year 973 A.D. It was a hymn sung at the installation of Bishop Dietmar at Prague, beginning with the phrase: 'Gospodi pomilŭj ny' (Lord, have mercy on us). When Czech literature had its resurrection, about the year 1800, and enthusiastic followers of the ardent movement everywhere searched for hidden records of the past, a number of MSS. turned up that were hailed with more or less plausibility as evidence of the ancient character of Czech letters. Some of these, it is now admitted by overwhelming authority among the Bohemian philologists themselves, were clever literary forgeries. The one MS. that aroused the greatest interest for many years was the so-called Königinhof collection of poetry. It was alleged to have been discovered, in 1817, in an ancient deanery church of the small Bohemian town of Kralové Dvůr (or Königinhof), and contained lyrical fragments, some of them charming, like 'Kytice' (The Nosegay), which Goethe subsequently translated, purporting to date from a very early age. However spurious this MS. maybe, there are still some moot points about it quite unexplained. The authenticity of another of these MSS., the one of Grüneberg, and a third one, of Saint Vitus, has likewise been assailed. But some of them, no doubt, are genuine enough, such as a fragment of the Gospel of Saint John; which seems to have been written in the time of the Slavic apostles, Methodius and Cyrillus, in the 10th century. And it must further be borne in mind that during the 150 years of ruthless Austrian oppression, about 1620–1774, it was the object of the Court of Vienna to wipe out, if possible, every vestige of separate Bohemian nationality and religious and literary life. The Jesuit, Konias, alone is recorded as having destroyed some 60,000 Czech books and manuscripts, many of them priceless and unique, in pursuance of this object. However, so far as susceptible proof is concerned, it is known that, aside from early folk songs, legends, etc., not distinctly traceable, poetry of no despicable order had penetrated Bohemia as early as the reigns of Wenceslas I and Ottokar II, about 1250, knighthood and its chivalrous lays drifting in apace, though most of it either in German or Latin. But we know of an adaptation in Czech of the 'Alexandreis' of Walter de Châtillon, about 1300; also of similar adaptations or translations in Czech of the Artus cycle, of the 'Tristan' version by Godefroy of Strassburg, and of 'Tandarias a Floribella' (in the 14th century). Next we find the rhymed chronicle, ascribed to Dalimir, but in reality the production of an unknown Bohemian knight, about 1334; also a Bohemian history in verse, and the tale 'Tkadleček,' written in excellent Czech prose, some time before 1400. Didactic and satirical original ditties in Czech or serious poems also flourished, such as the 'Nová Rada' (New Counsel), very popular in Bohemia (1394) and written by Smil Flaška, of Pardubitz, as also the 'Quarrel between Body and Soul' and some other spirited dialogues, as well as allegorical poems, such as the 'Anticlaudianus', after Alanus of Ryssel; also hymns, religious poems, legends, such as that of Saint Catharine, translations of psalms, mystery plays, such as 'Mastičkář', about 1320. The monks of the Abbey of Šazáva were distinguished in this way. Translations of portions of the Sacred Scriptures followed each other rapidly; the Lives of the Saints, mostly translated from the Latin, were collected in the reign of Charles IV, who was not only Emperor of the Holy Roman Empire, but also hereditay King of Bohemia and a Czech and most enlightened monarch of his time. This collection made at his bidding was called the Passional. The foundation of the University of Prague, in 1348, gave a strong impetus to Bohemian science and letters. One of its first graduates, Thomas of Stítný', wrote his theological disquisitions in Czech, whereas up to then the clerical Czech chroniclers and theologians had written in Latin, such as Kosmas of Prague (d. 1125). The oldest chronicle in Czech prose is that of the priest Pulkawa of Radomis (d. 1380). Marco Polo's Travels also were put into Czech at this time, and later those of Mandeville, described by Laurentius of Březová. Andrew of Duba, about 1375, wrote commentaries on the Laws of Bohemia. Then came one of the most important turns in Bohemian history, the advent and final death as a martyr (died at the stake, 6 July 1415, at the Church Council of Constance) of Ján Hus. This reformer was not only endeavoring to cleanse and popularize the Church of Rome and its teachings, but he, as did Luther for the Germans a century later, likewise did much to make the common vernacular a more vigorous and an apter instrument in diffusing knowledge. The war of religious propaganda, the so-called Hussite War, that followed the death of this great and good man, brought, nevertheless, much turmoil and injury to Bohemia and eventually to the Czech cause. In 1487 the first printing press was put up at Prague, and a full translation, in Czech, of the whole Bible was published there the following year. Before this, however, many cheap hand-written pamphlets in behalf of Hus and the equally inexpensive 'Postilles' and the 'Net of Faith' of the Moravian brother, Peter Chelničky, and similar fugitive publications on religious topics had circulated throughout Bohemia. Next we see, toward the end of the Middle Ages, a group of Czech historians and annalists who claim attention. There is Bartoš Pisář, who is also known as Bartholomew the Scribe, and who recorded faithfully and in detail the shining political events of his day, more particularly the period from 1524–37. So does, slightly later, Sixt of Ottersdorf, of the years 1546–47; and Martin Kůthen does the like. Vaclay Hajek of Libočan, in his 'Bohemian Chronicles,' writes often with reckless disregard of the truth, but in his account of the Thirty Years' War, especially 1618–20, he writes as an eye witness and most interestingly. Prokop Lopáč has given a faithful 'History of Charles IV,' and Brother Blahoslav, in his 'Historie Bratřska,' furnishes a good account of the Moravian Brothers' movement. The 'Captivity of John Angusta,' of 1547, by Jan Bilek is vividly descriptive, and Wenceslas Březan in his 'History of the House of Rosenberg,' toward the end of the 16th century, gives a graphic survey of the life and manners of the Bohemian nobility and of their political relations with the Court of Vienna. Charles of Žerotin, b. 1564 at Brandeis, a Czech nobleman, spent his whole life traveling and seeking adventures, and his correspondence is replete with the political gossip floating about in the countries and courts he visited. His writings are, therefore, most entertaining and many of his historical anecdotes delightful, but rather uncritical. He was in the service of Henry IV of France and died finally an exile from Bohemia. Wenceslas Vratislav, b. 1576, went to the Sultan's court at Constantinople with the Austrian ambassador, and shared his imprisonment there. His accounts of the Turks of those days are very amusing and graphic. Christopher Harant, another Czech noble, was likewise a great traveler, to the Holy Land, the Orient, Hungary, etc., and particularly in the campaigns against the Turks. His writings are interesting and minute. Count Wm. Slavata, b. 1572, d. 1652, published several volumes in which he describes the stirring events of his day, in some of which, as in the historically famous «fenestration» scene on the Hradžin in Prague, marking the outbreak of the Thirty Years' War, he was one of the main participants. Paul Skála, b. 1583 at Saaz, belonged to the burgher class. He wrote a 'Chronology of the Church,' a mere compilation, however. Lastly must be mentioned the voluminous writings of Ján Amos Koménsky (or Comeniůs), during the period both before and during the Thirty Years' War; those were mostly pedagogical or religious in tenor. His most pretentious book is 'Labyrint Sveta' (The Labyrinth of the World), of 1623. And then comes that long and unhappy period in the annals of Czech literature when it, together with the very language of Bohemia, came near being entirely obliterated, when it was suppressed and tabooed by the Austrian tyrants in Vienna. Toward the last quarter of the 18th century only do we see traces of a new life springing up. The Emperor Joseph II, an enlightened ruler, permitted the establishment of a Bohemian Society of Sciences. He also established a professorship of the Czech language at the University of Vienna, and later one at the University at Prague. Those were the beginnings of a literary resurrection for the Czech tongue as an idiom more than a mere rustic vehicle of intercourse and of Czech literature to boot. First in this new and amazingly fruitful period must be mentioned Joseph Dobrovsky, b. 1753, d. 1829, the man chiefly instrumental in this process. He was a deeply learned philological scholar, not only of Bohemian but of all Slavic languages. His main work, a masterly grammar of Czech, he wrote in German, as he did nearly all his works. But his 'History of the Bohemian Language and its Older Literature,' which followed some time after, in 1792, he himself rewrote in Czech, in 1818. And when the regular publication of the *Journal of the Museum of the Bohemian Kingdom* was proposed, in 1827, he insisted it should appear solely in German. He was also a Jesuit priest and was by no means stirred by enthusiasm in his life work of fashioning Czech anew for the struggle for existence. On the contrary, he remained thoroughly dispassionate and on the whole disapproved of his countrymen's burning desire to look upon the whole task chiefly from the viewpoint of nationalism. For all that, Dobrovsky it was who dug out the Czech language from the quagmire where it had been submerged so long and brought it to vigorous life again. Joseph Jũngmann, b. 1773, in his painstaking and wonderfully copious 'History of Bohemian Literature,' written all in Czech, as Czech now becomes once more the medium of thought for the Czechs, undertook a gigantic task in gathering in this work all the stray strands left of casual Czech writings during the past, especially the 150 years preceding. His dictionary, containing even many obsolete Czech words that he again included in the vocabulary, is umsurpassed in many respects even to-day. John Kollar, (1793–1852), b. in Mosovec, a Slovak village in northern Hungary, was for many years the pastor of the Protestant church in Pest; he advocated the literary unity of all Slav races. Later he held the chair of Slavic archæology at the University of Vienna. He was the author of 'A Daughter of Sláva' ('Slavy Deera'), a book of sonnets. Paul J. Šafařik) (1795–1861) was also of North Hungarian and Slovak origin, professor of Slavic philology at Prague, later librarian at the University there, but politically persecuted by the Austrian government until 1859, two years before his death, and died in complète impecuniosity. He wrote 'Tatranská Músa s. Lyroů Slovanskoů,' when only 19; also lyrics and a number of translations from the German and the Greek, and a history (in German) of

Slavic language and literature. This last named is a great work, full of original research on Slavic philology, dividing all the Slavs linguistically into only two branches. The only work he wrote in Czech is his ‘Slavic Antiquities’ (‘Starozitnosty Slovanske’). Francis Palacky (b.. 1798, d. 1876) from Hodslavice, Moravia. His monumental labor was his ‘History of Bohemia.’ This work is a phenomenal achievement, one of the great historical works of the world, and Palacky was busied with it until his death, adding, revising, reshaping. At first he wrote it only in German, but later on also in Czech. It made Palacky recognized among all Czechs as their greatest living man. He became, in 1827, editor of the *Journal of the Museum of the Bohemian Kingdom,* a periodical still flourishing and which Morfill, an Englishman and Slavologue, terms a ‘Mine of Slavic Lore.’ For his history he obtained, by extensive travels to the libraries of Dresden, Munich, Vienna, Italy, much original material. From 1861-76 he was the recognized leader of the National Party of Bohemia. He also wrote (in German) ‘Die Vorläufer des Hussitenthums’; ‘Würdigung der alten böhm. Geschichtschreiber’; ‘Zur böhm. Geschichtschreibung’ etc. Wenceslas Hanka (1791-1861), the alleged discoverer of the much-contested MS. of Königinhof, was the author of a collection of popular Czech lyrics, some Slavic philological works and many translations. Ladislav Čelakovsky wrote two volumes of pleasing lyrics ‘Echoes of Russian Song’ and ‘Echoes of Bohemian Song,’ full of Slav myths and ancient legends, and one entitled ‘Hundred-Leaved Rose.’ Charles Ignace Mácha’ (b. 10 Nov. 1810), died in 1836, in utter misery. He was one of the earliest Bohemian novelists of mark. His poetry was strongly imbued with the Byronic spirit, and Walter Scott formed his style of narrative. His chief work ‘Maj’ (May), a lyrical epic, and his group of tales, like ‘The Gypsies,’ survive him. Svatopluk Čech, b. in Ustredek, Bohemia, in 1846, was successively editor and contributor of the periodicals ‘Pokrok,’ ‘Svetozar’ ‘Lumir,’ ‘Kvety,’ and has written many excellent tales, novels, humorous short stories and several volumes of bright verse. His chief works are ‘Dreams,’ ‘Europa,’ ‘Jan Žiska,’ ‘Vaclav Ž Michalovic,’ ‘Dagmar,’ ‘Slavia,’ ‘Jitrni pisne,’ ‘Arabesky,’ etc. Many judges consider him the equal of the best. Thomas G. Masaryk, b. in Göding, Moravia, 1850, is chiefly a writer on sociological and political subjects. His writings, however, are nearly all in German; even his most sensational book, ‘Der selbstmord als soziale Massenersch,’ was translated in Czech only many years after its first appearance. His other chief works are ‘Ueber den Hypnotismus,’ ‘Ueber d. Studium d. dicht. Werke,’ ‘Gründzüge einer konkreten Logik.’ For many years he filled a chair in the Czech University at Prague. He has also been a great political radical leader of the Czech people. At the outbreak of the great European War he fled to foreign parts, and was condemned to death for treason, *in contumaciam.* In 1918 he undertook a trip for purposes of political agitation to the United States. Jan Rubeš is the author of ‘Ja jsem Čech a kdo je vic’ (a Czech patriotic song became a sort of war hymn). Joseph V. Kamaryt (1797-1833) is the author of ‘Piseň vesnicanův’; ‘Boleslav’; Jablonsky; (1813-81); J. Chmelensky and V. Stůlc are all poets of deeply nationalistic tendencies. Other novelists and short story writers of distinction are the following: Bohůmie Havlasa (1852-77), author of ‘Still Waters’; Aloys Jirásek, b. 1851, the author of ‘At the Court of the Voyvoda’; and ‘In Foreign Service’; Sophia Podlipská (1833-97); Jan Nerůda, ‘Tales of Old Prague’; Gustav Pfleger-Moravsky (1833-95), vivid tales; Jan Holly, a Slovak (1785-1849), author of ‘Svatopluk,’ an epic of the ancient glorious ruler of Moravia; J. E. Vocel (1802-71), ‘Sword and Chalice,’ a historical novel of the days of Ziska; Jaroslav Kalina (1816-47), a satirist and humorist; Jan P. Koubek (1805-54); Joseph J. Langer (1806-46), Aloys A. Smilovský’ (1833-85), dramatic and lyric writings, both of exceptional quality; Joseph G. Staňkovský’ (1844-79), ‘King and Bishop,’ ‘The Patriots of the Booth’; Karel Sabina (1814-77), one of the founders of the romantic novel in Bohemia, with Walter Scott as his model; Prokop Chocholoušek (1819-64); Adalbert Hlinka (pen name Francis Pravda); Benes Třebezky, author of many historical novels. Mrs. Bozena Nemcova deserves a word by herself. Her village tales have often been compared with those of Berthold Auerbach for their charm, but they are far more realistic. Her masterpiece, ‘Babička’ (Grandmother), has been translated into many languages. Emil Zibrt busied himself with the long-neglected subject of Bohemian folklore, publishing his results in ‘Česky Lid’ (The Bohemian People), of which he is the editor. His efforts are being ably seconded by Čelakovsky, Sušil and Erben. ‘Jaroslav Vrchlicky’ (pen name for Emil Frida), born 1853, is one of the greatest living Bohemian writers. Of his many works, his ‘Rok v Jihů’ (‘A Year in the South’) and his ‘Ponti k Eldoradů’ (‘Pilgrimages to Eldorado’) may be mentioned. He is also fertile as a dramatist. ‘Brothers’ and ‘Drahomira’ (both tragedies founded on events in Bohemian history) deserve especial mention. He has likewise published many polished translations from the works of foreign, particularly early Italian, poets. His ‘Moderni Basnici Angličti’ (Modern English Poets) is a volume of these. J. V. Sládek (b. 1845) has admirably translated Byron in metric form, also Coleridge and some Shakesperean plays. Julius Zeyer and Adolphus Heydůk are both poets and novelists of some distinction. Jacob Arbes (b. 1840) in his ‘Romanetta,’ a volume of short novels possessing a distinctive flavor of their own, is very original. Eliška Krasnohorská (b. 1847) and Karolina Světla (b. 1830), belong to the best women writers of modern Bohemia. The latter's admirable sketches from low life are unsurpassed in realism and depth of feeling. Her novel ‘Gold in the Furnace’ is certainly very good; and so is her ‘Zlato v ohni.’ Her real name is Johanna Mužák. Jaroslav Vlček is also worth noting among the better novelists. Among Bohemian historians of the day must also be mentioned V. Křižek (1833-81), who has written a synchronous history of the Slavic peoples; Constantine Jiriček (b. 1854), ‘History of the Bulgarians’; Joseph Perwolf (1842-92), ‘Mutuality among the Slavs’; Beda Dudik (1815-90), author of ‘History of Moravia’;

Vincent Brandl (b. 1834), K. V. Zap (1812–72), 'Bohemian-Moravian Chronicle'; M. Kolár, J. Havelka.

The drama has only begun to flourish in Bohemian literature the past 40 years, and especially since the erection of a National Czech theatre in Prague. Among the first dramatists was Joseph K. Tyl (1808–56), who wrote numerous plays. In one of them occurs the song 'Kde je domov můj' ('Where is my home?'), now the national air of Bohemia. Wenceslas Kličpera (1792–1859) wrote more than 50 comedies and tragedies and greatly aided the development of a Czech stage, though none of his plays are above the mediocre. Count Zdenko Kolovrat (1836–92) wrote several clever comedies. Of writers on scientific topics Jan Presl, professor of natural history in Prague, wrote much on this theme. Charles Jaromir Erben (b. 1810; d. 1870) as archivarian of Prague devoted his life to editing the works of earlier writers. He edited and published a new edition of the selected works of Jan Hŭs; also of Stítný's books on 'General Christian Matters,' the travel books of Harent of Polzič, the Chronicle of Bartoš, and of many other minor works. Joseph Jireček (1825–88) in his works deals mostly with Slavic, especially with Czech, literature. Jireček's 'Rŭkovet' is perhaps the best book on Bohemian literature extant. Of other historians, not mentioned heretofore, Anton Gindely (1829–92), wrote authoritatively on the period of the Thirty Years' War, on the reign and court of Rudolf II, and on the Moravian Brothers. Wenceslas Tomek is the author of a monumental work, 'Dějepis Mesta Praby' (History of Prague), a colossal work, full of erudition and of glimpses of Bohemian history in general. Joseph Kalousek (b. 1838; d. 1907) in his 'České Statni Pravo,' gives an account of the ancient Bohemian constitution. A. Goll (b. 1846), has written a history of the Moravian Brothers and a monograph on early relations between Bohemia and Prussia. Prof. Karel Tieftrŭnk (b. 1820; d. 1901), and Anton Rezek (b. 1853), wrote exhaustively of Bohemian history since the accession of the Hapsburgs (1526) and ending with the Battle of the White Mountains. In philology Prof. Ignace Gebaŭer has published the important 'Historical Grammar of the Bohemian Language.' Dr. Vaclav Flajšhans has also published a similar work. Very valuable for Bohemian early literature and philology are the labors of Adolphus Patera, head librarian of the Bohemian Museum in Prague.

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Wolf von Schierbrand,
Author of 'Austria-Hungary and the Polyglot Empire,' etc.

CZECHS and CZECHO-SLOVAKS, an ethnic group of the great Slavonic family of races. Of the former, about 7,000,000 inhabit Bohemia, Moravia and Austrian Silesia, while about 3,000,000 Slovaks live under Hungarian rule. The approximate total of 10,000,000 Czechs and Czecho-Slovaks must be accepted with some reserve. The last official census, 1910, shows a total of 8,404,000. Prominent Bohemians claim that the official figures are inaccurate and that the total stands nearer to 11,000,000. In 1526 the Czechs by popular choice invited the Hapsburgs to the Bohemian throne under pledges to respect the ancient privileges and liberties. The continual encroachments of successive Hapsburg monarchs upon the constitutional rights enjoyed by Bohemia since the 7th century reduced the country from a kingdom to a province by 1620 and had almost exterminated Czech nationality by persecution and confiscation. Many thousands were driven into exile; German was introduced as the official language and the Czech spirit rigorously suppressed. It was in the country districts and village communities, however, that the national language and aspirations were cultivated, and early in the 19th century a number of Czech writers inspired their countrymen to revive the smoldering embers of national consciousness. The European upheaval in 1848 strengthened the Czech movement; it assumed a political shape with the establishment of a Czech language press which found its first expression in a protest and a revolt against Germany's Central-European imperialism. Czech representatives were summoned to attend the German revolutionary Parliament at Frankfort; they refused, and convoked a Pan-Slav congress at Prague instead, at which Czechs, Poles and Jugo-Slavs formulated plans for unification. The dream came to naught; hopes of union were still further removed by the Ausgleich or Dualist Settlement of 1867, by which the Slovaks were separated from the Czechs and handed over to Hungary. By the same instrument the Czechs were compelled to send representatives to the Parliament in Vienna, which for years they had refused to do. They entered it under protest, still asserting the inalienable rights of the Bohemian Crown. Being in a hopeless minority, they were unable to exert any influence on foreign or domestic policy. The Austrian government never ceased its systematic coercion of the Czech minority, yet their national aspirations grew stronger under repression and broke into flame with the European War. A stringent policy was adopted in Bohemia; during the first 18 months of the war upwards of 1,000 Czech civilians were executed in Bohemia for political offenses. The Czecho-Slovak population was covered by the operations of the Imperial secret police. Women, girls and old men were crowded — chained — into cattle-trucks and conveyed to internment camps, where public floggings of both sexes were of frequent occurrence. During the Austro-Russian campaign thousands of Czechs went over to the Russians; many joined the Serbian army and the

French Foreign Legion. In the Austrian Parliament the leader of the Czech nationalists, Herr Stanck, declared on 30 May 1917 that his party would strive for the union of all the branches of the Czecho-Slavs into a democratic state.

Meanwhile, the Szecho-Slovak movement was energetically supported in the United States, France and England by the propaganda of Prof. Thomas G. Masaryk, its foremost representative and exponent. As organizer and president of the Czecho-Slovak National Committee, he lectured in London, Paris and New York, enlisting Allied sympathy on behalf of the oppressed Slavs in the Dual Monarchy. In June 1918 the British government accorded official recognition to the Czecho-Slovak National Council as the representative of the Czecho-Slovak nation and its aspirations. Similar recognition had already been extended by France, Russia and Italy. The celebration of Kossovo Day in New York on 17 June 1918 evoked a letter of sympathy from President Wilson, addressed to Dr. Axson, National Secretary of the American Red Cross. During the summer of 1918 there were large bodies of Czecho-Slovak troops operating with the Allies in France and Italy; about 14,000 landed in Vladivostok, and proceeded along the Siberian Railway with the Russian White Guards to oppose the Soviet or Bolsheviki government. By the end of June they controlled a number of towns on the railway for a distance of over 1,300 miles. Together with the White Guards they established a new Siberian central government at Novo Nikolaievsk, making the fourth government at the time claiming control of Siberia. (See BOHEMIA; RUSSIA; SLAVS; WAR, EUROPEAN). Consult the publications of the Bohemian National Alliance of America, Chicago; the Czech National Alliance in Great Britain, London; Baker, J., 'Pictures from Bohemia' (Chicago 1894); Balch, E., 'Our Slavic Fellow Citizens' (New York 1910); Capek, T., 'Bohemia under Hapsburg Misrule' (London 1915); Gayda, V., 'Modern Austria: Its Racial and Social Problems' (London 1915); Monroe, W. S., 'Bohemia and the Czechs' (Boston 1910), and the writings of R. W. Seton-Watson.

CZEGLED, tsē'glād, Hungary, large market town, in the county of Pest, circle of Ketskemet, on a plain between the Danube and Theiss, 46 miles southeast of Budapest. The land in the vicinity is well cultivated and produces large quantities of grain and common red wine. Grain is ground in local mills. It is a large military post for cavalry. Pop. 33,942, mostly Magyar.

CZERMAK, chĕr'māk, **John Nepomuk,** German physiologist and physician: b. Prague, 17 June 1828; d. Leipzig, 16 Sept. 1873. He studied at Vienna, Breslau and Würzburg and was appointed lecturer on physiology and microscopic anatomy at Prague; and later professor of zoology and comparative anatomy at Graz (1855–56); of physiology at Cracow (1856–58), and at Pest (1858–60). In 1865 he became professor of physiology at Jena and from 1869 till his death filled a similar position at Leipzig. He was the inventor and introducer of the laryngoscope and rhinoscope and of a new method for the therapeutical and surgical treatment of diseases of the epiglottis and throat. His work on 'The Laryngoscope' has been translated and published in several languages. His biography was published by Springer in 'Gesammelte Schriften' (2 vols., Leipzig 1879) and 'Populäre physiologische Vorträge' (1869).

CZERNIGOV, chĕr'nē-gōf, Russia, a province; area 20,232 square miles, bounded on the north by the province of Mohilef, on the east by Arel and Kursk, south by Poltava and west by Kief and Minsk. The surface, with exception of a hilly district along the Dneiper, is flat and the soil fertile. The Dnieper flows along its west frontier and the Desna passes through its centre. It has numerous lakes, though none are of great extent. All kinds of grain grow in abundance, but the crops often suffer from hosts of locusts. Hemp, flax, tobacco and the opium poppy grow well and the forests furnish timber and fuel. The chief mineral products are saltpetre, porcelain-earth, chalk and a little iron. The interior trade is almost confined to the four annual fairs, which are held in Nijni-Novgorod. The chief exports are cattle, corn, brandy, honey, wax and potash. Pop., almost all belonging to the Greek Church, 3,131,500.

CZERNIGOV, Russia, town, capital of the province of the same name, situated on the right bank of the Desna, 80 miles north-northeast of Kiev. It is a place of great antiquity and contains numerous buildings of antiquarian interest. It is the seat of an archbishop and has many churches — one of them, Saint Sophia, supposed to have been founded in 1024 — three monasteries, a gymnasium and an orphan hospital. Important annual fairs are held here. Pop. about 36,000.

CZERNIN, chĕr'nin, **Count Ottokar von und zu Chudenitz und Morzin,** Austro-Hungarian statesman: b. Dimokar, Bohemia, 27 Aug. 1875. For six years preceding the outbreak of the European War he served as Austro-Hungarian Minister to Rumania. On his appointment to that diplomatic post the Hungarian press raised a chorus of disapproval and Count Tisza, the Premier, even went to Vienna and protested to the Emperor Francis Joseph against the appointment. But Count Czernin was strongly supported by the late heir-apparent, the late Archduke Francis Ferdinand (q.v.), and was duly accredited to Rumania. The reason for his unpopularity in Hungary was that, both as politician and author, he had striven to range the German and Slav elements of the Dual Monarchy as against the Magyars. When Rumania declared war on Austria-Hungary on 27 Aug. 1916, another violent outcry arose in Hungary against Count Czernin for his failure to bring Rumania into the war on the Austro-German side. He had said all during the crisis that Rumania would either maintain a benevolent neutrality or else join the Central powers. It was charged against him that while he was still in Bucharest, Rumanian troops had been invading Hungarian territory (Transylvania) for 24 hours before either Vienna or Berlin knew that Rumania intended war. Already in 1914–15 Count Czernin had held out to Rumanian statesmen a prospect of liberal concessions by Hungary to the Rumanes of Transylvania, for which he was violently denounced by the Hungarian press. Nevertheless, on the removal of Baron Burian (q.v.) from the Foreign Office in December 1916, Count Czernin was appointed to succeed him, assuming also at the same time the offices of Minister of the Imperial House and president of the Joint Council of Ministers. As Baron Burian was always regarded as the instrument of Count Tisza, the accession of Count Czernin, who belongs to an old Bohemian (Slav) family with clerical tendencies, seemed to imply a diminution of Hungarian influence over the foreign affairs of the monarchy. One of his first official acts was to affirm the solidarity of the Austro-German alliance against all enemies in a telegram to the German Chancellor. See War, European — Peace Movements.

CZERNOWITZ, chĕr'nō-vitz, capital of the Austrian province of Bukovina, situated on the right bank of the Pruth. An insignificant village a century ago, it has developed into a clean and pleasant town of about 90,000 inhabitants, with numerous fine buildings and a magnificent episcopal palace. Though the majority of the people are Germans and the German language predominates, the population is more mixed than that of any other town in Austria; Jews, Greek Christians and Roman Catholics are nearly equal in number, while there are many Croats, Hungarians, Czechs, Italians, Ruthenes, Armenians, Poles, gypsies and Rumanians. Its importance is derived from its position as a local centre, a frontier place and a university, founded in 1875. Opposite Czernowitz is the small town of Sudagora, the home of a famous dynasty of miracle-working rabbis. During the European War the vicinity of the town was the scene of many violent conflicts. When the Russians overran Galicia and the Bukovina in August and September 1914 Czernowitz fell into their hands, but they did not hold it. Two months later, however, they recaptured the place, but were driven out in February 1915. They held it for a time in 1915, but withdrew across the frontier again. In January 1916 the Russians once more approached the town, routed the Austrians 10 June and took 35,000 prisoners. On the 16th they reoccupied Czernowitz and by the 24th they were in possession of nearly the whole of Bukovina. See War, European — Austro-Russian Campaign.

CZERNY, chĕr'nē, **George**, Serbian hospodar: b. near Belgrade, 21 Dec. 1766; d. July 1817. His true name was George Petrovitch, but he was called Czerny or Kara George on account of his dark color, «Czerny» in Slavonic and «Kara» in Turkish, signifying black. In 1788, as the leader of a Serbian volunteer corps, he fought in the Austrian army against the Turks, and in 1801 returned to his native country and organized an insurrection with the view of delivering it from the Turkish yoke. He succeeded in driving the Turkish garrisons out of Serbia, took the town of Belgrade (1806) and compelled the Porte to recognize him as hospodar of Serbia. When the Turks again invaded Serbia, in 1813, he was compelled to retire. In 1817 he ventured to return to his native country, in the hope of inducing Milosh Obrenovitch, who had meanwhile received Serbia as a vassal state from the Turks, to take part in a comprehensive scheme of rebellion; but Milosh betrayed him to the pasha of Belgrade, who caused him to be assassinated. A feud between the families of Milosh and George ensued. See Serbia; *Early History*.

CZERNY, Karl, Austrian pianist and composer: b. Vienna, 21 Feb. 1791; d. there, 15 July 1857; son of a teacher of the pianoforte, Wenzel Czerny, who was his first instructor. He then studied under Beethoven and Clementi and made rapid progress. At the age of 15 he began giving concerts and lessons and was enthusiastically received in the musical world. He was the author of an immense number of pieces, which, from their brilliancy, were at one time extremely popular. His exercises for the pianoforte are still valuable. They include 'Die Schule der Geläufigkeit' (Op. 299); 'Tägliche Studien' (Op. 337); 'Die Schule des Virtuosen' (Op. 365); 'Die Schule der Fingerfertigkeit' and many others. Among his pupils were Liszt, Döhler, Thalberg, Jaele and Kullak.

CZERNY, or **TCHERNY**, a Slavonic prefix sometimes signifying *black*, and sometimes *tributary*, appearing in many geographical names, as Czernigov, Czernowitz. It corresponds in the former meaning to Turkish Kara, Czerny George and Karageorge being interchangeable.

CZOLGOSZ, chōl'gōsh, **Leon**, American assassin: b. Detroit, Mich., 1873; d. Auburn, 29 Oct. 1901. He was of Polish-German ancestry; worked at various trades in the United States and became affiliated with anarchists. On 6 Sept. 1901, while President McKinley was holding a public reception at the Pan-American Exposition in Buffalo, N. Y., Czolgosz shot him twice. On 14 September the President died; on 23 September Czolgosz was brought to trial; on the 26th was sentenced to death, and was executed in the prison at Auburn, N. Y. See McKinley, William.

CZUCZOR, tsoo'tsōr, **Gergely**, Hungarian poet and philologist: b. Andód, 17 Dec. 1800; d. Pest, 9 Sept. 1866. He was a Benedictine monk, and the eroticism of the first collection of his 'Poetical Works' (1836) brought on him stern animadversion from his superiors. From 1825 to 1835, he was professor in the gymnasia at Raab and Komorn. He left the latter to accept a post as second secretary and keeper of the archives of the Hungarian Academy. Under these auspices he began the edition of the great lexicon of the Hungarian language published in six volumes 1861–74, of which four volumes were edited by him. His works are not scientifically accurate, because of his ignorance of comparative philology. He is best remembered for his poems, a later edition of which appeared at Pest in 1858. His two fine hero-ballads, 'The Battle of Augsburg' (1824) and 'The Diet of Arad' (1828) brought him instant celebrity. In 1848 he published 'Riadó', a passionate appeal to Hungarian national sentiment, and was imprisoned for it. Among his prose works are legends and translations of Latin authors and a 'Life of Washington.'

D

D the fourth letter of the English alphabet and the third consonant, is a sonant dental corresponding to the mute dental T. It holds the same place in the alphabets of the Phœnician, Syrian, Chaldee, Hebrew, Samaritan, Greek and Latin, and in those of all the modern European languages, except the Russian and the two or three others which retain the Cyrillic alphabet; in these the symbol of delta is the fifth letter. The most ancient forms of the symbol D in the languages of Phœnicia, Palestine, etc., are angular with the vertex pointing to the left, for example, ◁, ◃, and the most ancient Greek form was the same angular figure reversed, ▽ (changed afterward to △). In some ancient Greek inscripitons in Hellas itself and in the Greek colonies the angular form of the primitive delta (▷) is rounded to the form D, and this form was adopted by the Latins, who got it from the Greeks who settled in Campania, now the province of Caserta. For the later history of the letter see the plate to Alphabet. The sound of D is produced by pressing the end of the tongue against the upper gums and then forcing the vocalized breath into the mouth. The point of contact of the tip of the tongue with the gums in articulating the sound of D in English pronounciation is a little higher above the insertion of the teeth than when the D of those speaking other languages is sounded, and the same is to be said of the production of the sound of T. Hence the English sound is alveolar rather than dental. The letter D in very many English words represents an element in the speech of our early language ancestors which became for the Greeks theta (θ, *th*), for the Latins *f*, for the Germans *t*, for example, Eng. *deer*, Gr. θήρ, Lat. *fera*, Ger. *tier*. More curious is the change of the Greek name *Odysseus* to the form *Ulysses* in Latin, and within the Latin language itself the change of *olor* to *odor*, and from *dacrima* to *lacrima*, *adbiter* to *arbiter*. In many words in English *d* is intercalated or appended for phonetic reasons, for example, Old English *thonor* becomes *thunder*, Old English *soun* becomes *sound*, Norman English *jaunisse* becomes *jaundice;* on the other hand the *d* is dropped out of some words, for example, Old English *woodbind* becomes *woodbine; godsib, gossip; godspel, gospel.*

D is the Latin numerical symbol for 500. The ancient Romans represented a thousand by the symbol ↀ (later written ↀ), and they took one-half of that symbol to express half a thousand, 500. The symbol D with a horizontal stroke over it (D̄) stood for 5,000. In Roman personal names D stood for the prænomen Decimus; thus D. Junius Brutus.

As an initial D is used:

1. In chronology, (1) for *Domini*, genit. sing. of Latin. *Dominus* = Lord, as A.D. = *Anno Domini* = in the year of our Lord. (2) for died.
2. In music, as an abbreviation for *Discantus, Dessus, Destra,* etc.
3. In university degrees, etc., for Doctor, as M.D. = Doctor of Medicine; D.C.L. = Doctor of Civil Law; D.D. = Doctor of Divinity; D.Sc. = Doctor of Science, etc.
4. In English titles, for duke.
5. For Latin *Deus* = God and *Divus* = Divine.

D as a symbol is used:

1. In chemistry, didymium.
2. In music, for the second note of the normal scale of C corresponding to the Italian *re*, or for any symbol or key on a keyboard corresponding to this note. It is also used for the keys having this note for a key note.
3. In biblical criticism, for the Beza manuscript of the Greek New Testament.
4. In commerce, for English penny or pence, as £ s. d. = pounds, shillings and pence, being the initial of Latin *denarius*.

DAAE, dä'ė, **Ludvig**, Norwegian historian: b. Aremark, near Frederikshald, 7 Dec. 1834; d. Christiana, May 1893. He was for 20 years an active member of the Storthing; was several times minister in the various Radical cabinets; and won several gold medals with his historical essays on ancient Norway. His best-known works are ‘Norwegian Village Legends’ (1870–72); ‘Norway's Saints’ (1879); and ‘The Migrations of the Norsemen to Holland and England’ (1880).

DAB, a popular name given to several species of flatfish (*Pleuronectidæ*), which are found on European sea-coasts. The species known as dabs are *Pleuronectes Cimanda*; the long rough dab, *Hippoglossoides limandoides*, and the smeardab or lemon sole, *Glyptocephalus Microcephalus*. See Flatfish.

DABAIBA (also written Dabaybe, d'Abaibe, etc.), a region lying south of the Gulf of Darien, of which the boundaries were never exactly defined. Spanish adventurers in the 16th century learned, as a matter of common report, that they might find there, or at least by exploring in that general direction, a temple lined with gold; and in this half-true story told by the Indians of Darien we probably have the earliest form of the Eldorado myth. Balboa, when governor on the Isthmus, organized a Dabaïba expedition which he led in person (1512). One hundred and sixty men in two brigantines proceeded up the Atrato River, but made little headway against the hostile natives. Governor Pedrarias Davila (June 1515) sent 200 men under Luis Carillo and Balboa on the same errand. Attacked by Indians on the Atrato, one-half of the soldiers were killed, and the survivors took nothing but news of shameful defeat back to the coast. It seemed that «the mysterious dominion so mysteriously defended must hold great treasure, and in the inflamed minds of the Christians the savage pantheon of Dabaiba had risen into a lofty edifice glittering with gold and gems, and situated in a region rich and beautiful beyond comparison.» (H. H. Bancroft). Subsequently an expedition of 160 men under Tabria and Birues, with light brigantines and canoes, tempted fate upon the river. The savages on this occasion enjoyed more than their usual measure of supernatural protection, for «the divinity of the golden temple» sent a flood which uprooted trees, overturned one of the vessels and drowned both leaders. Even Francisco Pizarro, who was of the party, shared the superstitious fears inspired by these events to such a degree that he declined to assume command and continue the quest. Peter Martyr speaks of four attempts to gain the golden temple, one expedition attaining a distance up the river of 80 leagues; but «wonderful mischance! — the unarmed and naked people always overcame the armed and armored.» Francisco César, captain of infantry, starting from San Sebastian in 1536, with 80 foot-soldiers and 20 horse penetrated a short way into the mountains, returning with treasure valued at 30,000 castellanos. Pedro de Heredia in the same year led 210 mail-clad men into the sierra, but came back empty-handed. César, repeating his experiment, secured treasure amounting to 40,000 ducats. Next, Badillo led 350 men from Cartagena to explore the same region in 1537. The expedition lasted more than a year, and was a complete failure. One-half of the soldiers died; Badillo was ruined and disgraced; César, who accompanied him, lost his life. Such luring by occasional gains, such varied and dire misfortunes seemed the work of enchantment; but a realistic explanation is not far to seek. We know that the territory southeast of the Gulf of Urabá or Darien was subject to a cacique named Dabaybe; his name is still given to a village in the department of Antioquia and to a spur of the Western Cordillera in Colombia. This mountain range for years was an insuperable barrier preventing the isthmian Spaniards from extending their domain overland toward the south. Accordingly their eager search was fruitless, though the temple actually was in existence. The Indian stories described, accurately enough, the splendors of the Inca empire, of Curi-cancha and Cuzco (see those titles). But the adventurers could not realize, and the Indians themselves probably did not know, how far away the famous temple at Cuzco really was. The facts in the case, the accent of truth in the Indians' accounts, sustained the explorers' confidence year after year; but confident search in a region far removed from the object sought is always «mysteriously» baffling. Long before the report of Pizarro's discoveries in Peru reached the isthmus, a fixed belief had taken possession of the minds of the Spaniards that a kingdom more desirable than any they had despoiled, with gold-adorned temples, was somewhere hidden away in the heart of the continent. The attributes of elusiveness and mystery had become an indispensable part of the conception; therefore the true accounts of the wonderful Temple of the Sun did not exactly tally with the «glittering phantom» of their imagination. After Quesada (see COLOMBIA), starting from Santa Marta, succeeded in penetrating, by way of the Magdalena River, the region of Colombian uplands which lay beyond Dabaiba, naturally the golden temple was sought still further inland; and thus the headwaters of the Orinoco and Amazon were discovered. Bancroft and other writers following his prompting have suggested that an ancient building in the Cenú Valley, near which were found tombs containing gold and gems, may have been the temple of Dabaiba; it is quite impossible, however, to accept this conjecture, for the reason that colonists of San Sebastian came upon the Cenú building at an early date, and, if it had been the real object of their search, they would have been able, with the assistance of the natives, to identify it beyond question. See ELDORADO.

MARRION WILCOX.

DABB, or PALM-LIZARD, an agamoid lizard (*Uromastix acanthinuras*), common in the sandy deserts of northern Africa.

DABCHICK (*Podicipes fluviatilis*), a bird of the family *Podicipedidæ* and the smallest of the grebes, distinguished by the absence of cephalic crests. The total length slightly exceeds nine inches; the back is brownish black; the belly has silvery gray mixed with the dusky color, but is whiter and more silky in winter; the bill bluish in summer, dull yellow in winter. It ranges and breeds throughout tropical and temperate Europe, Asia and Africa. See GREBES.

DABLON, dăb'lôṅ', **Claude,** Jesuit missionary: b. Dieppe, France, February 1618; d. Quebec, 3 May 1697. In 1639 he entered the Society of Jesus and in 1655 was sent to Canada. With Chaumonot he was sent to establish a mission among the Iroquois at Onondaga. He endured great hardships on his journey to and from this mission. In 1661, with Druillettes, he journeyed overland to Hudson Bay to discover an outlet to the China Sea and to establish missions among the Indians of that region. With Allouez and Marquette he was on Lake Superior in 1668 and was the first to inform the world of the rich copper mines of the region. Dablon appointed Marquette to undertake the expedition which resulted in the discovery of the upper Mississippi. In connection with this discovery he drew attention to the feasibility of passing from Lake Erie to Florida «by cutting a canal through only half a league of prairie to pass from the end of the Lake of the Illinois (Michigan) to the River of Saint Louis (the Illinois). This project after more than 230 years was revived in 1907. Dablon founded Sault Sainte Marie and in 1670 was appointed general of all the Canadian missions, retaining that office until 1680. He was again appointed in 1686 and remained in office until 1693. His contributions to the ‹Jesuit Relations› are of great value for his descriptions of places and peoples and his clear and comprehensive narration of events. Consult Campbell, ‹Pioneer Priests of North America› (New York 1908).

DABNEY, Charles William, American college president: b. Hampden-Sydney, Va., 19 June 1855. He is a son of R. L. Dabney (q.v.). He was graduated at Hampden-Sydney College in 1873, and at the University of Virginia in 1877; and for two years studied in Berlin and Göttingen. He was professor of chemistry in the University of North Carolina, and State chemist, and later director of the North Carolina Agricultural Experiment Station at Raleigh, and an executive officer of the Cotton Centennial Exposition, New Orleans, 1884–85, and of other industrial expositions. He was prominent in establishing the North Carolina College of Agricultural and Mechanical Arts, Raleigh; assistant Secretary of Agriculture of the United States, 1893–97; president of the University of Tennessee, 1887–1904; and president of the University of Cincinnati after 1904. He discovered phosphate and tin-ore deposits in North Carolina. He has published, among other works, ‘Washington's Interest in Education’ (1899); ‘History of Agricultural Education in America’ (1899); ‘Agriculture and Education’ (1899); ‘A National University’ (1897); ‘The Problem in the South’ (1903); ‘Educational Principles in the South’ (1904); ‘The Relation of Agriculture to Other Sciences’ (1904); ‘The Meaning of the Solid South’ (1909); ‘The South Renationalized by Education’ (1911).

DABNEY, Julia Parker, American artist and author: b. Fayal, Azores, about 1850. She was educated at Teneriffe, Canary Islands, and in Boston. She published ‘Little Daughter of the Sun’ (1896); ‘Poor Chola’ (1897); ‘Songs of Destiny’ (1898); ‘The Musical Basis of Verse’ (1901).

DABNEY, Richard Heath, American historical writer: b. Memphis, Tenn., 29 March 1860. He is a son of Virginius Dabney (q.v.). He was graduated at the University of Virginia in 1881, afterward studying and taking the doctor's degree at Heidelberg, 1885. He was professor of history in Indiana University, 1886–89; and assistant professor, 1889–96; associate professor, 1896–97, and professor of historical and economical science after 1897 in the University of Virginia. In 1905 he became dean of the department of graduate studies there. He has published ‘The Causes of the French Revolution’ (1888); ‘John Randolph: A Character Sketch’ (1898); and numerous magazine articles and pamphlets.

DABNEY, Robert Lewis, American Presbyterian clergyman: b. Louisa County, Va., 5 March 1820; d. 1898. He was a professor in Union Theological Seminary, Virginia, 1853–83, and from 1883 was professor of philosophy in the University of Texas. During the Civil War he was a major in the Confederate army and in 1862 was Gen. «Stonewall» Jackson's chief of staff. He published ‘Life of General Thomas J. Jackson’ (1864); ‘Defense of Virginia and the South’ (1868); ‘Sacred Rhetoric’ (1866); ‘Sensualistic Philosophy’ (1878); ‘Theology, Dogmatic and Polemic’ (1879); and ‘Collected Discussions’ (1891).

DABNEY, Virginius, American author: b. Elmington, Va., 15 Feb. 1835. His publication of ‘The Story of Don Miff, as Told by his Friend, John Bouche Whacker, a Symphony of Life’ (1886), reached its fourth edition in six months. He also published ‘Gold that Did not Glitter.’

DABOIA, dạ-boi'ạ, the generic name of a venomous serpent of the East Indies, known also as Russell's viper.

DA CAPO, dä kä'pō (It. «from the head or beginning»), in music, an expression written at the end of a movement, to acquaint the performer that he is to return to, and end with, the first strain. It is frequently used in the abbreviated form D. C.

DACCA, dăk'ạ, or **DHAKA,** dhā'kā, India, a division of eastern Bengal and Assam, extending from the Gāro Hills to the sea. It is one of the richest divisions in India, and although containing a good deal of jungle and unoccupied land, produces such quantities of rice as to be called the granary of Bengal. The surface is an uninterrupted flat, and is intersected by three great water systems, the Brahmaputra, the Padmā and the Meghnā. The periodical inundations give rise to its extraordinary fertility. Dacca was at one time celebrated for its hand-woven muslins, which are of singular delicacy and beauty. This branch of industry, however, is now carried on to a very small extent. The fineness of the yarn or thread used in the making of these muslins is not equal to that in some fabrics of European manufacture, but in durability and delicacy the Dacca muslins excel other muslins. The finest or «royal muslin» used to be worth about $5 a yard. For the most delicate varieties only yarns are used that are some years old. Pop. about 11,000,000.

DACCA, India, city, capital of the district of the same name, and for 80 years, during the 17th century, the capital of Bengal. It is the largest city in eastern Bengal, and is situated on the river called the Boor Gunga (Old Ganges), at the distance of about 150 miles northeast of Calcutta. In this city and vicinity, the celebrated Dacca muslins are manufactured, jute works have been established in recent years and boat building is carried on. It has an extensive manufacture of shell bracelets, much worn by the Hindu women. The city was formerly much more extensive than it is at present (in 1801 having a population of 200,000), and exhibited a degree of splendor to which it has now no pretensions, as the magnificent ruins of bridges, causeways, caravanseries, palaces, gardens, etc., sufficiently prove. Destructive tornadoes visited the city in 1888 and 1902. Dacca is considered one of the healthiest and most pleasant places in Bengal. A teaching and residential university was founded here in 1914. Pop. 108,551.

DACE, a name rather loosely applied to various species of small fresh-water fishes of the minnow family (*Cyprinidæ*), but especially to members of the genus *Leucisus*, of which 22 North American species are discriminated; others belong to *Rhinichthys*, *Notropis* and *Semotilus*, those of the latter being also called chubs and roach. *Semotilus atromaculatus*, the horned dace, is one of the best known and largest species, and abounds in the small brooks of the eastern half of the United States. As in many of the other species, the upper surface of the head of the male is ornamented during the breeding season with cutaneous tubercles. Because of their abundance the dace are important as furnishing food for larger fishes, and some of the larger species are much sought by juvenile anglers. The European dace (*Leuciscus leuciscus*) is common in British rivers, as well as in those of France, Germany and Italy. It prefers deep, clear streams and swims in shoals. See Cyprinidæ.

DACH, däh, **Simon**, German lyrist: b. Memel, 29 July 1605; d. Königsberg, 15 April 1659. From 1639 he was professor of poetry, and 1656–57 was rector of the University of Königsberg. His numerous hymns and songs are found in various collections, his hymns especially in the ‘Scriptural Arias’ of Heinrich Albert. His ‘Annie of Tharau,’ a Low-German lay for the wedding of his friend Parson Portatius with Anna Neander, became a popular favorite; his ‘Praise of Friendship’ seems to belong to a better age; and his spiritual songs ‘In Thy Control, O Lord,’ ‘Be Comforted, my Soul,’ etc., are hardly surpassed by any compositions of his day.

D'ACHE, Caran, kä-rän dăsh. See Poiré, Emmanuel.

DACHSHUND, däks'hoont (Ger. *dachs*, badger; *hund*, dog), a breed of small German hounds with very long, cylinder-shaped bodies; short, crooked legs; large heads; long pendant ears; and short, stiff, smooth hair. In color these dogs are black-and-tan, or tan with black ears, the former being the characteristic coloring of the best sort. They were originally used in Germany to hunt badgers, and sometimes even in fox-hunting. Though slow in movement, they are possessed of a keen scent, and great power of endurance, rendering them valuable as hunting-dogs when suitably trained. They are much used by sportsmen on the continent of Europe, but their usefulness is impaired by the difficulty of keeping them under proper command. The dachshund is akin to the old English turnspit, and a similar dog is depicted on the ancient Egyptian monuments.

DACIA, dā'shĭ-ạ, in ancient times, a district of uncertain limits to the north of the Danube, inhabited by the Daci or Getæ, afterward a Roman province. It comprised that region now known as Moldavia, Wallachia and portions of Transylvania and Hungary. For a long time the Daci were formidable enemies of the Romans, and during the reign of the Emperor Domitian obtained so great an advantage that the emperor was compelled to accede to a disgraceful peace. To wipe off this stain Trajan, the second emperor after Domitian, in the year 100 A.D. invaded the Dacian territory, and forced the Dacian king, Decebalus, to accept humiliating terms of peace. These he soon broke; and Trajan entering Dacia a second time, again subdued it, and then erected it into a Roman province, 106 A.D. The Romans remained masters of this province till the reign of the Emperor Aurelian, when, in 274 A.D., they withdrew from the region to the north of the Danube, and assigned to the Roman colonists of Dacia a territory on the south of the Danube lying between Upper and Lower Mœsia, which was hence called Dacia Aureliani. The former Dacia was now successively overrun by the Goths, Huns, Gepidæ and Avares. Since that time the history of this country, which then lost the name of Dacia, is to be sought for in that of the provinces of which it formerly consisted.

DACIA, a Hamburg-Amerika liner originally employed in the cotton trade between Galveston and Hamburg. Just before the outbreak of the European War she entered Port Arthur, Tex., and remained in obscurity there until, at the end of the year (1914), the announcement was made that she had been sold to Mr. Breitung, an American citizen of German extraction. It was also stated that the vessel, renamed the *Margaret*, was to carry a cargo of cotton direct to Bremen, sailing under the American flag. The British, French and Russian governments would not admit the transfer of the vessel to American registry on the grounds that such transfer was not valid in accordance with international law. It was further objected that this transfer would, if allowed, serve as a precedent on which might be decided the fortunes of a large number of German liners interned not only in the United States, but in many other neutral countries. On 21 Jan. 1915 the British Ambassador in Washington gave notice that his government was unable to agree to the transfer and that, if the *Dacia* (or *Margaret*) put to sea and were captured, she would be brought before a prize court. If, however, the cargo consisted solely of cotton owned by American citizens, the British government would guarantee the purchase of the cargo at the price which would be realized by the shippers if it had arrived at its foreign destination; or, if preferred, the government would undertake to forward the cotton to Rotterdam without further expense to the shippers. The United States Treasury Department decided to insure the cargo, but refused to insure the vessel. Clearance papers were issued on 22 January, from Galveston for Rotterdam; after coaling at Norfolk, Va., the ship sailed on 12 Feb. 1915. On 28 February she was arrested in the Channel by a French warship and taken into Brest. On 5 July 1915 the *Dacia's* cargo was declared a prize, and to be sold at Havre 27 July. The validity of the seizure was confirmed by the prize court on 4 August.

DACIER, dä'sē'ā', **André**, French philologist: b. Castres, Upper Languedoc, 6 April 1651; d. 18 Sept. 1722. He studied at Saumur under Tanneguy Lefèvre, whose daughter Anne was associated in his studies. After the death of Lefèvre, in 1672, he went to Paris, and in 1683 he married the daughter of his former teacher. In 1695 Dacier was elected a member of the Academy of Inscriptions and of the French Academy; of the latter he was afterward perpetual secretary. The care of the cabinet in the Louvre was entrusted to him. Besides editions of ‘Pompeius Festus’ and the ‘Œuvres d'Horace, en latin et en français,’ with the ‘Nouveaux eclaircissemens sur les Œuvres d'Horace’ (1681–89), and ‘Nouvelle traduction d'Horace’ with critical annotations, he prepared translations of ‘Marcus Antoninus,’ ‘Epictetus,’ ‘Aristotle's Art of Poetry, with Annotations.’ In general, he is erudite and mediocre in his writings.

DACIER, Anne Lefèvre, French classical scholar: b. Saumur, March 1654; d. Paris, 17 Aug. 1720. She was wife of the preceding, and early displayed her learning by an edition of ‘Callimachus.’ Her learned works were not interrupted by her marriage, which took place in 1683. In her ‹Considérations sur les causes de la corruption du goût› she defended Homer with the acuteness of a profound commentator, and Lamotte replied with a great deal of wit and elegance; on which account it was said Lamotte wrote like an ingenious woman, Madame Dacier like a learned man. In her ‹Homère défendu› she showed little mercy to Hardouin, who had written a satirical eulogy of this poet. On this occasion she was said to have uttered more invectives against the reviler of Homer than the poet himself had placed in the mouths of all his heroes. She edited Aurelius Victor, Dictys Cretensis, Eutropius and Florus for the Delphin classics. She translated ‹Terence› and three pieces of ‹Plautus,› in the prologue of which she treats of the origin, the cultivation and changes of dramatic poetry with acuteness. Her translation of the ‹Plautus› and the ‹Clouds› of Aristophanes deserves indulgence as the first translation of the Greek comic poet. Her translation of Anacreon and Sappho, with a defense of the latter, met with success. Equally estimable for her character and her talents, she gained as many admirers by her virtue, constancy and equanimity, as by her works. She was a member of several learned academies.

DACITE, a volcanic rock of the diorite family, of porphyritic or compact texture, having crystals of plagioclase felspar quartz and biotite in a glassy or finely crystalline-ground mass. The name is derived from the old province of Dacia, now part of Hungary. Dacites grade into andesites by a lessening of the amount of silica, and differ from rhyolites and trachytes in containing plagioclase rather than orthoclase felspar. A typical dacite shows on analysis the constituent acids and bases in about these proportions: S_2O_2 67.2; Al_2O_3 17.0; Fe_2O_3 3.5; FeO 1.2; CaO 4.5; MgO 1.5; Na_2O 3.7; K_2O 1.6. Dacites are found at Lassen's Peak, Cal.; in the Yellowstone Park; in the Eureka District, Nev., and elsewhere in the western United States. See DIABASE; DIORITE.

DACOITS, bands of robbers in the East, especially in Burma, India, where for years they were the terror of the country until the annexation of Burma by the British in 1886.

DA COSTA, Izaak. See COSTA, ISAAC DA.

DA COSTA, Jacob Mendes, American physician: b. Saint Thomas, W. I., 7 Feb. 1833; d. Villanova, Pa., 11 Sept. 1900. He was descended from an ancient Portuguese family long resident in Saint Thomas, W. I. He received his early education at Dresden and other places in Europe. He was graduated at Jefferson Medical College in 1852. He afterward studied in Paris and Vienna and on his return to America began to practise in Philadelphia. He specialized in clinical medicine and pathology. In 1863 he became lecturer in Jefferson Medical College, in 1872 professor of the theory and practice of medicine there, and in 1891 professor emeritus. His method of teaching and ability as a lecturer attracted general notice, and he became known as one of the greatest clinical teachers of his time. In 1895 he was chosen president of the College of Physicians and Surgeons in Philadelphia. He wrote ‹Harvey and His Discovery› (Philadelphia 1879); ‹Modern Medicine› (ib. 1872); ‹The Physicians of the Last Century› (ib. 1857); ‹The Scholar in Medicine› (Boston 1891); ‹Medical Diagnosis› (9th ed., Philadelphia and London 1900), his greatest work, which has been translated into several languages, etc.

DACROCYSTITIS, dăk-rō-cys-tī'tĭs, an inflammation in the tear-sac. It may result only in the sub-acute swelling of the tear-sac, or it may become purulent, very much inflamed, swollen and painful and finally discharge pus. Prompt evacuation by surgical means is the safest and best treatment.

DACRYDIUM, a genus of tall trees, mostly Australian, of the natural order *Taxaceæ,* nearly related to the genera *Podocarpus* and *Taxodium,* important timber and ornamental trees. Several species are of wide utility in ship- and house-building and furniture-making, especially for carved furniture; others yield edible fruits (drupes) and seeds. A kind of beer is made from the young twigs of some species. The most valued species are probably *D. kirkii, D. cupressinum* and *D. franklinii,* the so-called huon-pine, which is really a yew. They often attain heights of 100 feet and diameters of four feet or more.

DACRYOMA, a disease of the lachrymal duct of the eye, by which the tears are prevented from passing into the nose, and consequently run over the eyelid.

DACTYL, in Greek and Roman versification, a foot consisting of one long followed by two short syllables. In the following line, for example,

Tityre | tu patu | lae recu | bans sub | tegmine | fagi,

the first, second, third and fifth feet are dactyls. In modern hexameter verse a dactyl is represented by one accented and two unaccented syllables. The word is derived from the Greek *daktylos,* a finger, because a finger has one long and two short joints. See VERSIFICATION.

DACTYLIOMANCY (Greek *daktylios,* a ring, and *manteia,* divination), the pretended art of divining by means of finger rings.

DACTYLIS, or ORCHARD-GRASS, a monotypic genus of the grass family (*Gramineæ*) native of Europe and Asia. It is naturalized in America, and cultivated as a fodder plant. The flowers are in rounded compressed spikelets at the end of a one-sided panicle. The fruit is loosely enveloped in the glume. The common orchard grass (*D. glomerata*) is often met with in fields and waste places. It is a coarse grass, relished by cattle in its wild state, and especially acceptable in its cultivated state. It grows from New Brunswick south to South Carolina, westward to Kansas and north to Manitoba. It is sometimes called cocksfoot-grass. Its tendency to grow in clumps can be overcome by rolling. It yields two good crops a year. See GRASSES.

DACTYLITIS, etymologically, an inflammation of the finger, but generally restricted to an osteomyelitis of the phalanges or metatarsal or metacarpal bones. This may be either tuberculous or syphilitic. In tuberculous form the bone slowly enlarges, the skin becomes reddish, softening takes place, and pus is discharged through a short cavity which leads to dead bone. In its treatment care should be paid to the general condition of the patient. General up-building, by cod-liver oil and other tonics, is necessary. Surgical procedures may be imperative. In the syphilitic form, which usually affects infants, there is as a rule a gummatous deposit in the bones. It resembles the tuberculous forms, but responds to treatment by means of potassium iodide.

DADAYAG, dä-dä-yäg', the name of a Philippine tribe of Malayan race, who live in the Cagayan mountains in Luzon. The Dadayags are said to have been cannibals. Their speech differs in some respects from that of any other of the 47 tribes of the Malayans.

DADDY-LONG-LEGS, a name sometimes substituted for the more appropriate term "cranefly," to designate the small British dipterous insect of the family of *Tipulidæ,* some groups of which are harmless, and dance in the twilight air, while others are injurious to growing crops. They are true flies, though having long legs. In America the name daddy-long-legs is applied only to the harvest-spider, of the family *Phalangidæ,* which is not a fly. The body is very small when compared with the great length of the legs, which contain over 50 joints each. The legs are thought to be organs of sense as well as of locomotion. This harvestman lives on small insects and is entirely harmless to man.

DADO, dā'dō, an architectural term for the middle part of a pedestal, that is to say, the solid rectangular part between the plinth and the cornice; also called the die. In the interior of houses it is applied to a skirting of wood several feet high round the lower part of the walls, or an imitation of this in wall-paper or painting.

DADUCHUS (Lat.-Gr., *dadouchos*), literally a torch-bearer, an epithet applied to any ancient divinity or other personage when represented as bearing a torch or flambeau. The Daduchi were those participants in the celebration of the Eleusinia at Athens, who carried the sacred torches.

DÆDALION, dē-dā'lĭ-ŏn, the son of Lucifer, changed, according to the Greek legend, by Apollo into a falcon, when in grief over the death of his son Philonis, killed by Diana, he leaped from the summit of Mount Parnassus.

DÆDALUS, dē'da-lŭs or dĕd'ā-lŭs, mythical Greek sculptor, the scene of most of whose labors is placed in Crete. According to the common accounts Dædalus lived three generations before the Trojan War, was distinguished for his talents in architecture, sculpture and engraving, and as the inventor of many instruments; for instance, the axe, the saw, the plummet, the auger; also of glue and masts and yards for ships. As a sculptor he wrought mostly in wood, and was the first who made the eyes of his statues open. He built the famous labyrinth and a temple of Artemus Britomartis in Crete; and executed for Pasiphaë the notorious wooden cow. Being imprisoned with his son Icarus, he invented wings for flying. The wings were fastened on with wax, and Icarus flew so high that the heat of the sun melted the wax, and the wings dropped off, leaving him to fall into the sea, whence the Icarian Sea is said to have received its name. Dædalus himself reached Sicily, on the southern coast of which a place was called, after him, Dædalium. Philologists suppose that Dædalus is not really a proper name, but the common appellation of all the first architects, metallurgists and sculptors in Grecian antiquity, being derived from or akin to the Greek daidallein, "to work with skill." The mythical Dædalus is sometimes confused with Dædalus of Sicyon. Consult Kuhnert, 'Dædalus' (Leipzig 1886).

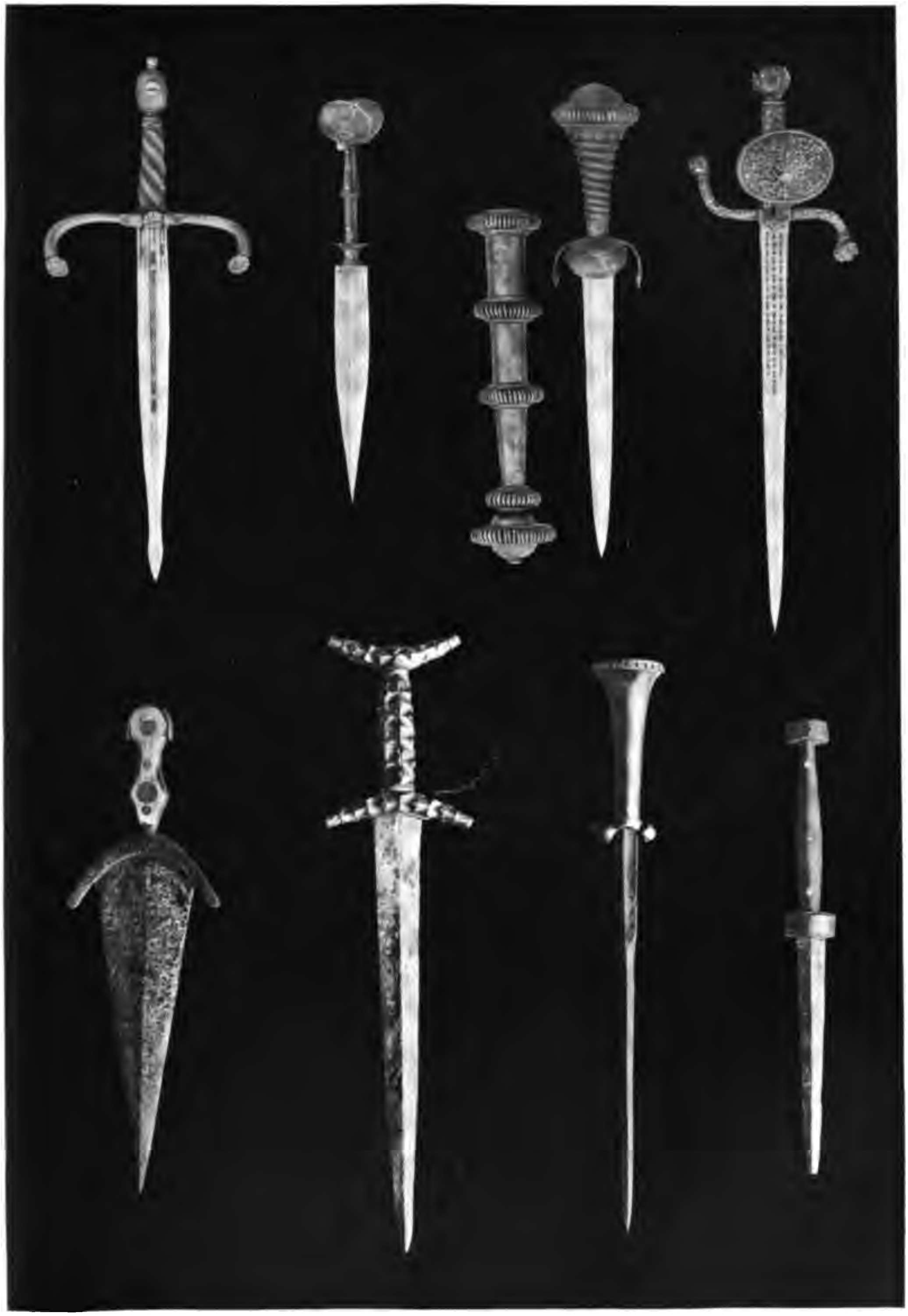
DÆDALUS OF SICYON, Greek sculptor who lived about 400 B.C. He is said to have been the pupil, and some authorities say the son, of Patrocles. The trophy or stack of armor erected at Olympia, in remembrance of the victory over the Lacedæmonians, was attributed to Dædalus. Other works credited to him are 'Two Boys using the Strigil'; 'Cowering' or 'Crouching Venus'; and a number of portrait statues of victors in the Olympian games.

DÆMONELIX, a scientific name provisionally given to an extraordinary formation apparently fossiliferous, extending over a large area in northeastern Nebraska and eastern Wyoming. The soft sandstone of this region has undergone excessive erosion, leaving fantastic figures, some of them 40 feet high. The objects to which the term is especially applied are of various shapes, including gigantic pillars, lower cake-like forms, and columns appearing like fingers and cigars. Those particularly exciting scientific inquiry are spiral and twisted, giving rise to the local name "Devil's Corkscrew." These in some cases resemble huge hop-poles with definite vines running up spirally, or screws with exactly cut threads. In other cases the corkscrew is closely imitated, leaving the spiral without the central pole. They penetrate the fossil bones found in the same beds. So far as the tests have gone, the composing material is found to contain cellular, non-vascular, parenchymatous tissue — a fibre distinguishing it from its stony matrix, and not to be referred to animal but rather to plant origin, and pointing to an alga. It has been suggested that they are merely well-preserved rodent burrows. See Barbour, E. H., 'Nature, Structure and Phylogeny of Dæmonelix' (*Bulletin of the Geological Society of America,* Vol. VIII, Rochester 1897); Peterson, 'Description of New Rodents and Discussion of the Origin of Dæmonelix' (*Carnegie Museum Memoirs,* Vol. II, Pittsburgh 1905).

DAENDELS, dän'dĕls, **Hermann Wilhelm,** Dutch general: b. Hattem Gelderland 1762; d. Africa, June 1818. He took part in revolutionary disturbances in Holland in 1787, and was in consequence compelled to seek refuge in France. In the campaign of 1793 he rendered important service to Dumouriez, and was elevated to the rank of a general of brigade. In 1806 he took service under the king of Holland, and from 1808 to 1811 he was governor-general of the Dutch East Indian possessions, and published 'Staat der Nederlandsche Oost-Indische Bezittingen' (1808–11). On the overthrow of Napoleon, the new king of Holland, William I, entrusted Daendels with the organization of the Dutch colonies on the coast of Africa, and there he died.

DÁET, dä'ät, **Philippines.** (1) City of Luzon, in the province of Ambos Camarines, situated between the Dáet River and one of its branches. It is a radiating point of several roads, a port of entry. It was the capital of the

DAGGERS



Top (Left to right) 1 Dagger for Left hand (Main Gauche; Italian: XVI Century). 2 Eared Dagger (Venetian: End of XV or beginning of XVI Century). 3 Landsknecht Dagger with Sheath (German: Middle of XVI Century). 4 Dagger for Left hand (Main Gauche; Italian: Second half of XVI Century). Collections Ressman, de Dino and Metropolitan Museum, New York. Bottom (Left to right). 1 Dagger in Cinquedea Style (Venetian: Early XVI Century). 2 Dagger with Antenna-form Pommel (Flemish: XV Century). 3 Kidney Dagger (Burgundian: XV Century. Grip restored). 4 Dagger a Rondelle (South German: XV Century). Bashford Dean and Spitzer collections loaned to the Metropolitan Museum of Art, New York

Spanish province of Camarines Norte. There are gold mines in the vicinity and the ruins of an old Spanish fort. Pop. about 15,000. (2) A river which enters the sea near the town of the same name.

DAFFODIL (corrupted from the Latin *asphodelus*), the English name of those species of *Narcissus* which have a large bell-shaped corona. The common daffodil (*N. pseudo-narcissus*) is a native of England and of nearly all parts of Europe, growing in woods and hedges, and often cultivated in gardens, where it not unfrequently becomes double. In gardens many varieties of it are among the most esteemed of early flowers. See NARCISSUS.

DAFOE, John Wesley, Canadian journalist: b. Bangor, Ontario, 8 March 1866. He received his education at Arnprior high and public schools and after serving as a school-teacher joined the Montreal *Star* in March 1883, and was its Parliamentary correspondent at Ottawa. In December 1885 he resigned from the *Star* and accepted the editorship of the newly-founded *Evening Journal* of Ottawa. In May 1886 he went west and was on the editorial staff of the Manitoba *Free Press* up to March 1892, when he was called to Montreal to accept the chief editorship of the *Daily Herald*, the leading English Liberal organ in the province of Quebec. He remained with the *Herald* until August 1895, when he became a member of the staff of the *Star* and was for six years editor of its weekly edition. Since 1901 he has been editor-in-chief of the Manitoba *Free Press*. He has published 'Fortunes of a Manitoban' (1891); 'Western Canada' (1907); 'The Imperial Press Conference' (1909).

DAGAMI, dä-gä'mē, Philippines, town in the province of Leyte, on the Maya River, 16 miles south-southwest of Tacloban. Pop. 25,000.

DÄGE, dä'gẹ, **Eduard,** German historical painter: b. Berlin, 10 April 1805; d. there, 6 June 1883. He was a pupil of Neiderlich and Wach at the Berlin Academy, finishing his studies in Italy. In 1838 he was elected a member of the Academy; in 1840 he became professor and was vice-director 1861–75. Besides his religious paintings, mostly altar-pieces, Däge was remarkable for his genre pictures of small size. His chief works are found in the churches of Rostock and Sigmaringen, and in the chapel of the Château at Berlin. His 'The Old Sacristan' and the 'Discovery of Painting' hang in the National Gallery at Berlin. Among his other works are many altar-pieces for churches: 'The Parcæ' and 'Woman and Child,' in the Raczynski Gallery in Berlin; 'Initiation of a Nun'; 'Shelter at the Altar'; 'Charitable Monk'; 'Roman Woman and Child.'

DAGGER-MOTH, a common name given to both *Acronycta* and *Apatela*, genera of nocturnal moths, which feed upon the leaves of orchard trees and small fruits. *Acronycta* has fore wings varied with dagger-like black marks. *Apatala* has gray fore wings margined with black dots and transverse lines. The caterpillar is of a velvety black color and is beautiful. It forms its cocoon by wrapping itself in leaves bound with a silken thread.

DAGGERS, short-bladed weapons for stabbing. There are still extant flint daggers not less than 5,000 years old. Homer makes mention of the dagger. Primitive nations use daggers made of wood, bone, animals' sharp horns, etc. The *cultellus*, or *coustel*, of the 11th century was used by Saxon and Norman foot soldiers for piercing the links of the hauberk (see HAUBERK) in dispatching unhorsed knights; it got to be as long as a short sword. In the "camail and jupon" period (see CHAIN ARMOR) the *misericorde* ("Dagger of Mercy"), used by the knights in dealing the "coup de grace," had a triangular blade and hung by a chain from the knight's right breast. It became a very short sword in the plate armor period (see PLATE ARMOR), with a thin, sharp blade that could penetrate between the junctures of the armor parts. In the reign of Richard II of England (14th century) everybody wore a dagger, even the ladies carried a *baselard* attached to the girdle. The long Continental poinard followed. A dagger that was called *anelace* was worn by civilians in the 14th and 15th centuries; the brasses of that period display it. The left-handed dagger (*main-gauche*) was in use in the 16th century; it was to ward off the opponent's sword thrusts while the right hand was offensively wielding the sword. The "kidney" dagger, with its heavy blade and stout wooden handle, had a guard consisting of two round lobes, whence the name "kidney." It was used from the 14th century till the reign of Charles I in England. The *dague à rouelle*, with its disc-shaped guard, belongs to the 15th century. The "eared" dagger (of Oriental origin) had two ear-shaped flat lobes serving as pommel. To the 15th century also belongs the "ox-tongue" dagger, having a short blade and wide groove and flat hilt. It developed, in Italy, into the *cinquedia* dagger, so called from its "five-finger" breadth of blade at the hilt end.

The more modern Italian *stiletto* has a slender, short, but thick, tapering blade. But daggers have been used less and less in more recent times and remain now in warfare, but with the maritime forces (midshipmen) carried as a side-arm (*dirk*). The dirk is still carried in the stocking of the Scotsman as a show feature of former days. See also JAPANESE AND ORIENTAL ARMS AND ARMOR.

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CLEMENT W. COUMBE.

DAGGETT, Mary Stewart, American writer: b. Morristown, Ohio, 30 May 1856. She was graduated at Steubenville Seminary 1873. In 1888 she removed to California. Columbia Hill, Pasadena, San Gabriel Valley, has been her home for 25 years. Southern California environment influences much of her writing. Mrs. Daggett has published the following novels: 'Mariposilla' (1895); 'The Broad Aisle' (1899); 'The Higher Court' (1912); 'The Yellow Angel' (1914) also short stories.

DAGHESTAN, dä-gĕs-tän', Russia, province in the Caucasus, stretching along the west side of the Caspian Sea; area, 11,471 square miles. It is very largely in the region of the Caucasus Mountains, some of the peaks rising to 14,000 feet, and its climate is in the main rigorous. Its fertile and cultivated valleys produce good crops of grain, silk, cotton, flax and tobacco. It was a province of Persia until 1812. Pop. 689,300 (mainly Lesghians, and Mohammedan in faith).

DAGNAN-BOUVERET, dän-yän boov-rā, **Pascal Adolphe Jean**, French painter: b. Paris, 7 Jan. 1852. He was a pupil of Gérome, and recipient in 1874 of the second "Grand Prize of Rome." He soon broke with the style of Gérome and showed the influence of Bastien Lepage. His picture of the death of Manon Lescaut, which took the medal of the third class at the Salon of 1878, showed him to be in possession of an original and particularly individual style of painting. ‘A Wedding Party at the Photographer's,’ exhibited in the Salon of 1879, was much admired for composition and technique. But this style was too close to caricature and was soon abandoned. In the Salon of 1880 he displayed a much more serious form of talent. His picture ‘An Accident,’ which took the medal of the first class that year, remains one of his masterpieces, being greatly admired for the truth of its types and expressions. These early works ranked him among the most keen portrayers of our modern manners. ‘The Blessing of a Young Couple before Marriage’ (1882) bore the stamp of extraordinary poetical feeling which his later paintings — illustrating, for the most part, the life, customs and costumes of Bretagne — have served to accentuate. In his ‘Hamlet and the Grave Diggers’ the artist is himself represented as the moody Danish prince. Among his best-known works are ‘The Consecrated Bread,’ in the Luxembourg; ‘The Virgin’; ‘The Bretons at the Pardon’ (1886); ‘The Breton Peasant’ (1888); ‘The Cemetery of Side Kebir’; ‘The Conscripts’; ‘The Lord's Supper’ (1896), a very great work; ‘The Horses at the Watering Trough’; two portraits of de la Rochetaille and Gustave Courtois; ‘Spanish Dancer’ (1909); ‘Marguerite au Sabat’ (1912). Very modern in his taste for individuality, he resembles the great masters in the touching simplicity of his feeling, and the idealism which is evolved from and illumines his strong realism. See Stranahan, ‘History of French Painting’ (1899); Van Dyke, ‘Modern Fernch Painters’ (1896).

DAGO, däg'ė, or **DAGDEN**, Russia, an island included in the government of Esthonia. It is situated to the southwest of the entrance of the Gulf of Finland, and has productive fisheries. The soil is mostly poor, and the coast rocky. The inhabitants include many Swedes. The country belonged to Denmark, but was acquired by Sweden in 1645 and annexed to Russia in 1721. Pop. about 16,000.

DAGOBA, in Buddhist countries and those which at one time held the Buddhist faith, a massive temple building containing relics. The word is said to be derived from *dá*, *dátu*, or *dhátu*, a relic, and *geba* or *garbha*, the womb. They are built of brick or stone, are circular in form, and are erected on natural or artificial mounds, while the stone or brick structure itself sometimes rises to an immense height. The contents of a dagoba usually consist of stone or metallic vessels of various shapes and sizes. One of the articles is usually a silver casket, with a gold casket, often highly wrought with chased work on the surface and set with precious stones, and this second casket is either enclosed in the first or lying beside it with the rest of the objects. Some of the smaller articles, such as pearls, gold, buttons, rings, beads, etc., are sometimes contained in these caskets, which are in some cases scratched on the surface with a peculiar character. These dagobas are held in the highest veneration by the Buddhists, and a common mode of testifying their veneration is to walk around them, repeating prayers. Some remarkable dagobas are to be seen at Anuradhpura, in Ceylon.

DAGOBERT I, däg'ō-bėrt or dä-gō-bär, king of the Franks: b. about 600; d. Epinay 638. In 628 he succeeded his father, Clothaire II, who had acquired the divided members of the Frankish Empire. He waged war with success against the Slavonians, Gascons and Bretons; but stained the splendor of his victories by cruelty, violence and licentiousness. He deserves praise for his improvement of the laws of the Franks. He was buried in Saint Denis, which he had founded.

DAGON, a deity of the Philistines, whose image is generally believed to have been in the form of a triton or merman, with the upper part human and the extremities, from the waist downward, in the shape of the tail of a fish. From this latter supposition the name is derived from the Hebrew *dag*, a fish. Dagon and his temple are mentioned in Scripture, more especially in 1 Sam. v, 4. Another derivation takes the origin of the word from a Semitic root *dagan*, meaning grain, and thus makes the god a patron of agriculture. The same name is used of a god of Babylon. His temples were at Gaza and Ashdod and he was probably worshipped at other places than Phoenicia, as the testimony of place names and names of several kings indicate. Milton alludes to him in describing the infernal senate in ‘Paradise Lost.’

DAGUERRE, dä-gär, **Louis Jacques Mandé**, French inventor: b. Cormeilles, Seine-et-Oise, 18 Nov. 1789; d. Petit-Brie, near Paris, 10 July 1851. He was at first a scene-painter at Paris, and while engaged in painting panoramic views, he discovered a method of representing moonlight, day and night, changes of season and so on, by the proper illumination of a large transparent canvas painted on both sides. (See DIORAMA). The pictures were first exhibited in Paris in 1822. On 19 Aug. 1839 his successful completion of photographic printing was announced to the Academy by Arago. As early as 1814 Nicéphore Niépce had directed his attention to photography, and in 1827 had delivered pictures on metal to the Royal Society. In 1826 he had been joined by Daguerre, and on 14 Dec. 1829 a formal agreement was made between them. Niépce died 5 July 1833, and had apparently before his death given up the hope of succeeding with a plate sensitized by iodine. Daguerre, however, persevered, and at length produced the method which has been since called daguerreotype. In 1839 the discovery was published and Daguerre received a pension of 6,000 francs and became a member of the Legion of Honor. He published several works describing his inventions. See DAGUERREOTYPE PROCESS.

DAGUERREOTYPE PROCESS. This is one of the earliest methods known for fixing the image afforded by the camera, and thus producing permanent pictures, or "photographs." As practised by Daguerre (q.v.), the method consisted in exposing a silver plate to the action of iodine vapor until a sufficient coating of iodide of silver was produced upon it, the image in the camera being then exposed upon it for a time varying from three minutes to an hour or more, according to the nature of the subject and the intensity of the light. The plate was then submitted to the action of the vapor of mercury, which condensed most upon the parts where the light had acted most, and in this way greatly increased the distinctness of the image. The plate, after development by mercury vapor in this way, was immersed in a solution of hyposulphite of soda, which dissolved those parts of the iodide that had not been affected by light, and thus rendered the picture permanent. Daguerre made the details of his process public in 1839, and for this he was awarded a pension by the French government. Important improvements in the method were soon made. In December 1839, before the first French photograph by the iodine process had been received in the United States, Dr. Paul Beck Goddard of Philadelphia discovered that iodine could be advantageously replaced by bromine, an element discovered by Balard 13 years before. By the use of bromine, the sensitiveness of the plate was increased so greatly that Dr. Goddard obtained some practically instantaneous views. Early in 1840 Robert Cornelius, of Philadelphia, fitted up a room exclusively for portraiture, and this was the first photographic studio in the world. The expensive silver plates were afterward replaced by plates of copper that had been heavily electroplated with silver, and a method of toning the pictures by the use of chloride of gold was also devised. Daguerre was associated, in his experimental work, with Nicéphore Niépce, who had previously discovered the bitumen process (q.v.) of taking photographs; and many authorities maintain that Daguerre took unfair advantage of his partner, and published, as his own, processes for which Niépce should have had equal credit. However this may be, it is certain that Niépce died in 1833, some years before Daguerre produced any pictures by the method that now bears his name; and it would appear that Daguerre is at least entitled to the sole credit for the discovery of mercury as a developing agent. The way in which this discovery came about is of deep interest, and was cited by Professor Liebig as one of the finest examples of the inductive method of reasoning. Daguerre had discovered that iodide of silver is affected by light, and he had repeatedly iodized silver plates and exposed them in his camera, with the result that feeble images were obtained. He was filled with hope that some way might be found to intensify these images, but he worked for years without success, and Niépce died with a feeling of regret that they had wasted so much time upon a method that was apparently incapable of yielding the results that they sought. On one occasion, after the death of Niépce, Daguerre removed one of his old plates from a closet in which it had been stored, and was about to repolish it and use it over again in a new experiment, when he observed that the view to which it had been previously exposed, and which showed but faintly when he had put the plate away, was now strong and clear. Without disturbing anything in the closet, he prepared a new plate, sensitized and exposed it as before, and placed it in the closet for a similar time. The same intensification of the image was observed. He concluded that the developing agent that he had sought so indefatigably was present in his closet, but he had no idea what it could be. To identify it, he prepared and exposed plate after plate, each time leaving the plate where the first one had stood, but each time removing one article from the closet. The pictures still developed, even when the last thing had been apparently removed. He found, however, that some mercury had been spilled in the closet, and being driven to the conclusion that this was the mysterious agent sought, he tried it, and his mercury development process was the result.

DAGUN, a god worshipped in Pegu, Burma. According to Hindu mythology, when Kiakiak destroyed the world, Dagun reconstructed it. The similarity of name to Dagon, the national god of the Philistines mentioned in 16 Judges v, 23 is obvious.

DAGUPÁN, dä-goo-pän', Philippines, a town in the province of Pangasinan, Luzon, situated on the Lingayen River where it enters the gulf of the same name, about 130 miles northwest of Manila, on the Manila and Dagupán Railroad. It is an important road centre, and has a large trade. It was one of the strongholds of the Filipino insurgents and the point where most of the filibustering expeditions landed. Soon after hostilities between the United States and the insurgents opened, the American military authorities were unanimous in the opinion that Dagupán should be made a base of operations, but sufficient troops were lacking till November 1899, when an expedition left Manila for this place under command of General Wheaton. A landing from the transports, supported by a number of naval vessels, was made at Lingayen, a suburb of Dagupán, which has a sheltered harbor and had hastily constructed earthworks. The works and town were shelled, but there was no response from shore. As the American troops were being landed in steam launches a long line of insurgents suddenly appeared among the sand dunes and fired on the troops. The Americans returned the fire, completed their landing and drove the insurgents out of Dagupán, and then started on a march to the east and south in the expectation of surrounding Aguinaldo at Tarlac, where he had established his headquarters. Pop. 20,357.

DAHABIEH, dä-hä-bē'ē, an Egyptian barge-like boat, the forerunner of the European and American house-boat, used on the Nile for conveyance of travelers. It varies considerably in size, has one or two masts, with a very long slanting yard on each mast supporting a triangular or lateen sail, and affords good accommodation for passengers. Seats on the fore and aft deck are used by rowers when needed. Wealthy travelers often hire one of these vessels for a trip up and down the river, the voyage to the First Cataract and back, under the most favorable circumstances, occupying seven weeks, and three weeks more if prolonged to the Second Cataract. Their use, however, has been largely superseded by pleasure steamers.

DAHL, Johann Christian Clausen, Norwegian landscape painter: b. Bergen, Norway, 24 Feb. 1778; d. Dresden, 14 Oct. 1857. His talent displayed itself early and he studied at the Academy of Copenhagen 1811–18. He then went to Dresden, where from 1821 onward he was professor of painting in the Art Academy. Among his works are 'Storm at Sea' (1823); 'Winter Landscape' and 'Kronberg by Moonlight' (in Schiefer Castle near Gotha). He was a prolific painter and his works are found in many European galleries. Consult Aubert, 'Maleren Professor Dahl' (1892–94).

DAHLAK, dä-läk', a group of three islands, with many smaller rocks, in the Red Sea, off the Bay of Massowah. They are famous since Roman times for their pearl-fisheries. They carry on a trade with the Arabian coast. They are a dependency of Italy. The main island is Dahlak-el-Kebir, 32 miles long and 18 wide. The entire area of the group is about 450 square miles. The population is made up of Nubians and Arabs who number about 1,500.

DAHLGREN, Fredrik August, Swedish poet and dramatist: b. Nordmark, 20 Aug. 1816; d. 1895. He wrote many dialect songs and ballads, collections of which were published in three volumes (1876). These have attained an extraordinary degree of popularity. Of his dramas many have been very successful; his 'Vermländingarne,' a musical drama (1846), had more than 100 consecutive representations. He translated a great many dramas from foreign languages, and wrote a history of the Swedish stage.

DAHLGREN, John Adolf, American naval commander: b. Philadelphia, Pa., 13 Nov. 1809; d. Washington, D. C., 12 July 1870. In 1826 he entered the navy of the United States as a midshipman, in 1837 was advanced to the rank of lieutenant, and in 1855 to that of commander. From the year 1847 he was employed on ordnance duty, and invented the cannons which are called after him Dahlgren guns, besides contriving a more effective method of arming gunboats with 12- to 24-pounder howitzers, throwing canister-shot and shrapnel-shells. At the outbreak of the Civil War he was commander of the naval station at Washington; in July 1862 he undertook the supreme command of the South Atlantic squadron; and after the death of Admiral Foote in 1863 was appointed rear-admiral of the fleet stationed before Charleston. He led a successful expedition up the Saint John's River in 1864, assisted Sherman in the capture of Savannah and in 1866 was given command of the South Pacific squadron. He served as chief of the ordnance bureau 1868–70 and just before his death was placed in charge of the navy yard at Washington. He is the author of 'Thirty-Two Pound Practice for Ranges' (1850); 'Systems of Boat Armament in the United States Navy' (1852); 'Naval Percussion Locks and Primers' (1852); 'Ordnance Memoranda' (1853); and 'Shells and Shell-guns' (1856); 'Notes on Maritime and International Law' (1877). Consult Mrs. Dahlgren, 'Memoir of John A. Dahlgren' (1882).

DAHLGREN, Karl Fredrik, Swedish poet and humorist: b. Stens-Bruk, East Gothland, 20 June 1791; d. Stockholm, 2 May 1844. He excelled in descriptions of nature and in the idyllic burlesque. Many of his songs and ballads have a permanent place in the treasury of Swedish popular songs. For years he published a 'Muses' Almanac,' containing his stories and comic sketches. His novel 'Nahum Fredrik Bergström's Krönika' (1831) is a work of distinguished merit.

DAHLGREN, Madeleine Vinton, American author; wife of Rear-Admiral Dahlgren: b. Gallipolis, Ohio, about 1835; d. Washington, D. C., 28 May 1898. Her works include 'Idealities' (1859); 'South Sea Sketches' (1881); 'Etiquette of Social Life in Washington' (1881); 'Memoirs of John A. Dahlgren' (1882); 'The Lost Name'; and 'Lights and Shadows of a Life' (1886). For her Spanish translation of Donoso Cortes' 'Catholicism, Liberalism, and Socialism,' she received the thanks of Pius IX.

DAHLGREN, Ulric, American military and naval officer: b. Bucks County, Pa., 1842; d. 4 March 1864. He was a son of Rear-Admiral J. A. Dahlgren (q.v.). At the outbreak of the Civil War he became aide, first to his father and later to General Sigel, and was Sigel's chief of artillery at the second battle of Bull Run. He distinguished himself in an attack on Fredericksburg and at the battle of Chancellorsville, and on the retreat of the Confederates from Gettysburg he led the charge into Hagerstown. He lost his life in a raid undertaken for the purpose of releasing national prisoners at Libby prison and Belle Isle.

DAHLGREN GUN (named from Rear-Admiral John A. Dahlgren), a gun in which the front portion is materially lightened and the metal transferred to the rear, giving the "bottle-shape," which caused some surprise on its first appearance in Europe. They were in use in the Civil War, but are now obsolete.

DAHLIA, a genus of perennial herbs of the family *Asteraceæ,* closely related to the genera *Bidens, Coreopsis* and *Cosmos* (q.v.), which are distinguished by technical characters. Indeed, *Cosmos diversifolius,* or black cosmos, is well known to American gardeners as *Bidens* and *Dahlia.* The true dahlias are much confused as to nomenclature, only about 10 well-authenticated species being recognized out of a large number of synonyms. With few exceptions (Central American species) they are natives of Mexico. Six species are cultivated, but only two of these (*D. rosea* and *D. juaresii*) are of wide horticultural importance. The former has given rise to several thousand horticultural varieties since 1814, when well-marked double varieties first appeared; the latter, which was introduced about 1879, has produced a considerable number popularly known as cactus dahlias. There are also many single varieties. Considering the short time the dahlias have been in cultivation (since 1879) they have attained a very high rank as a garden plant, being numbered among a dozen plants to have special societies and exhibitions, both in Europe and America. Besides the cactus forms, which are less formal than the earlier double varieties, there are many forms and sizes ranging in color from white to yellow and deep red, but deficient in the shades of blue. The plants may be propagated by seeds for obtaining new varieties, by division of the underground parts, or commercially by cuttings. They succeed well in almost any good soil, the tubers or the young plants being set in beds as soon as danger from frost is past. When frost has killed the tops in the autumn the plants are dug and the tubers stored in a cool, dry cellar until spring, or until they are needed for obtaining cuttings, when they are placed on greenhouse benches and forced. Few pests attack the plants. Consult Peacock, ‘The Dahlia,’ and other literature mentioned in article «Dahlia» by Bailey in ‘Cyclopedia of American Horticulture’; ‘Dahlia, a Talk About,’ Cornell University Experiment Station *Bulletin* 128.

DAHLIN, dä'lĭn, a white substance, also called inulin, obtained from the pounded tubers of the dahlia. The juice is pressed from the tubers, clarified by standing, mixed with an equal bulk of strong alcohol, filtered, and then with two other volumes of alcohol. Inulin precipitates, and is washed and dried. It is a white starchy powder, with distinct crystalline character; it has no taste or smell, is hygroscopic, but sparingly soluble in water, until it passes into a non-crystalline modification. The tubers pounded and distilled with water yield a strongly smelling, sweetish ethereal oil, which is heavier than water, but becomes buttery and semicrystalline in it. The tubers also contain a fixed oil and salts of organic acids. The coloring matter of the purple dahlia is very sensitive to acids, which turn it red, and to alkalis, which turn it green. When extracted by water or alcohol, and paper steeped in it, it forms Georgina paper, and is used as a chemical test instead of red and blue litmus paper.

DAHLMANN, däl'män, **Friedrich Christoph**, German historian: b. Wismar, 13 May 1785; d. Bonn, Prussia, 5 Dec. 1860. He studied at Copenhagen and Halle; in 1812 was appointed professor extraordinary of history at Kiel, and in 1829 accepted a call to fill the chair of political science in the University of Göttingen. There he continued his historical studies, but did not on that account altogether abandon the domain of politics. He contributed in great measure to the establishment of the constitution of Hanover in 1833, and was a vigorous advocate of liberal principles. In 1842 he was appointed to the chair of history in the University of Bonn, where he gave himself up entirely to literary pursuits. The revolution of 1848 recalled him to public life. He was sent as a deputy to the Diet of the confederation, had a share in elaborating the constitution called that of the «Seventeen,» and became one of the chiefs of the constitutional or parliamentary party. He was afterward a member of the Prussian Chamber of Deputies, in which he set himself to withstand the reactionary movement which followed the troubled period of 1848–49; but finally renounced politics entirely, and devoted the remainder of his life to literature. He left a large number of works, all characterized by great depth, an accurate understanding of the events he relates and a thorough knowledge of men. Among these are his ‘Quellenkunde der deutchen Geschichte’ (1830); ‘Geschichte Dänemarks’ (1840–43); ‘Geschichte der englischen Revolution’ (1844); and ‘Geschichte der französischen Revolution’ (1845). Consult Nasse, ‘F. C. Dahlmann’ (Kiel 1885); Springer, ‘F. C. Dahlmann’ (Leipzig 1870–72).

DAHLONEGA, dä-lŏn'ę-gą, Ga., county-seat of Lumpkin County, about 20 miles north by west of Gainesville, on one of the branches of the Chattahoochee River, among the foothills south of the Blue Ridge Mountains. It is the seat of the North Georgia Agricultural College, a department of the State University. The town is the centre of the richest gold mining region east of the Mississippi River. The town was first settled in 1831 by gold miners. It was incorporated in the following year and is governed by a mayor and a city council. The principal industries are those connected with the mining and refining of gold. Until the Civil War a United States branch mint was situated here. The Cherokee Indians called the place Dah-lo-ne-ga, meaning «yellow money.» Pop. 829.

DAHLSTJERNA, däl-shĕr'nạ, **Gunno**, Swedish poet: b. Öhr, Dalsland, 7 Sept. 1661; d. Pomerania, 7 Sept. 1709. His father was a clergyman named Eurelius. The son's versatility as surveyor, cartographer and poet, earned him a title of nobility as Dahlstjerna in 1702. He received his degree at Upsala in 1677 and in 1687 refused the offer of a professorship at Leipzig. From 1681 he was in the land surveying department of Sweden of which he was appointed director in 1699. During his long journeys in Sweden, Livonia and Pomerania, he composed the patriotic poems on which his fame rests. Chief of these are: ‘Kunga Skald’ an elegy on the death of his master Charles XI (1697); and the spirited ‘Goth's Battle Song’ (1701).

DAHN, dän, **Felix**, German historian and novelist: b. Hamburg, 9 Feb. 1834; d. 1912. At the universities of Munich and Berlin, where he was educated, he made especial studies in history and jurisprudence. In 1857 he was appointed privatdozent at the former institution, becoming professor of law there five years later. In 1863 he removed to Würzburg in a similar capacity, to Königsberg in 1872, and lastly to the University of Breslau in 1888. His historical works include ‘Die Könige der Germanen’ (9 vols., 1861–1902); ‘Urgeschichte der germanischen und romanischen Völker’ (4 vols., 1881–90). He also wrote ‘Das Kriegsrecht’ (1870); ‘Handelsrechtliche Vorträge’ (1875); ‘Deutsches Privatrecht’ (1878); ‘Die Vernunft im Recht’ (1879); ‘Die Landnot der Germanen’ (1889), all in law and jurisprudence. In poetry, he published ‘Markgraf Rüdeger von Bechelaren’ (1875) and ‘Die Staatskunst der Frauen’ (1877); in fiction, ‘Ein Kampf um Rom’ (1876); ‘Odhins Trost’ (1880); ‘Felicitas’ (1883); ‘Fredigundis’ (1885); ‘Attila’ (1888); ‘Stilicho’ (1900); ‘Sigwalt und Sigridh’ (1898); ‘Herzog Ernst von Schwaben’ (1902) and ‘Die Germanen’ (1905). A collection of his literary works appeared (21 vols., 1898; continued 1903–).

DAHOMEY, dä-hō'mĭ or -mā (native name of the people, *Dauma* or *Dahomé*), West Africa, formerly a negro kingdom, now one of the colonies of French West Africa, bounded on the east by the British possessions of Nigeria and Lagos, on the south by the Gulf of Guinea, on the west by Togoland (German), and on the north by the French military possessions; area about 42,000 square miles, having been increased in 1900 by territory in the north, adjacent to the Niger. The coast line is only about 70 miles in length, but opens out northward into a wide hinterland. About midway on the coast lagoon is the port of Whydah, whence a road extends inland to Abomey, a distance of 65 miles. Dense forests and dismal swamps cover nearly two-thirds of this distance, but from the Great Swamp of Agrimé vast undulating plains rise for many miles in the direction of the Kong Mountains. The Avon and Denham lagoons receive the rivers, which are not very important. The soil is extremely fertile. Among native trees are the baobab and the coconut palm. Groves of oil-palms encircle each town, and palm-oil is made in large quantities. Maize, beans and peas, as well as cassava, yams, sweet potatoes, limes, oranges, pineapples and other tropical fruits grow in luxuriance; cotton, sugar and spices of all kinds are also grown, and sheep, goats, swine and poultry are raised, though not in large numbers.

In 1911 the imports, which consisted chiefly of liquors, tobacco, machinery and cotton goods, were valued at $3,904,906; and the exports, which were chiefly maize, copra, kola nuts, rubber, palm-oil and palm kernels, $4,391,660. Some cotton cloth is made in the country, and weapons and tools are forged from native iron. There are few roads in the country, but in recent years they have been greatly improved. A new metalled road (310 miles in length) for motor traffic runs from Savé to the Niger. In 1902 a railway was constructed from the port of Kotonu into the interior to Savé (156 miles). The line is intended to run to Chaoru (400 miles). The gauge is a metre. A metre gauge railway has also been constructed from Porto Novo to Pobé (50 miles) along the Lagos frontier. A telegraph line connects that port with Abomey, the Niger and the Senegal. There were 1,389 miles of telegraph and 70 of telephone line in 1916. The currency consists of cowrie shells and French, English and American coins. The colony is administered by a lieutenant-governor with an administrative council. The seat of government is Porto Novo, the chief business centre, which has about 30,000 inhabitants. At Kotonu is a wireless-telegraph station, and there is regular steamship communication with Europe. Dahomey was an absolute monarchy previous to the French occupation. There was a standing army estimated at over 15,000, consisting partly of female warriors or Amazons, who were distinguished by superior physique and high skill in the use of weapons. The natives are full-blooded Guinea Negroes, or Nigritians of the coast. The Dahomans are tall, very long-headed, but not so black as the tribes of Senegal. In their own tongue, a dialect of the Ewe language, common in this part of the Slave Coast, they are called Fon or Fawin. Their religion is purely fetish, and the sacrifice of human beings, a widespread custom in former times, is still supposed to be practised. In spite of a low standard of morality and warlike attributes and usages, the Dahomans are polite in their intercourse. The activity of missionaries has thus far been attended with little success, except in the case of the dervishes, who are indefatigable in their efforts to spread the gospel of Islam. The population was estimated in 1911 at 902,000. Whites numbered less than 500. The kingdom of Dahomey arose in the 17th century around the city of Abomey as a nucleus. By successive conquests the kings extended their rule to the highlands of the Mahé on the north and to the Slave Coast on the south. There they came into contact with Europeans and succeeded in obtaining control of a large part of the slave trade, which was then actively carried on by the English, the French and Portuguese. With the cessation of the slave trade the prosperity of the country came to an end. France secured a firm footing on the coast in the second half of the 19th century. Between 1878 and 1885 it obtained possession of Kotonu, Porto Novo and Grand Popo, and after a bloody contest in 1890 forced King Behanzin to acknowledge its title to the coast region. War broke out again in 1892 and resulted in the taking of Abomey, the deposition of Behanzin, since retained a prisoner at Fort-de-France, Martinique, and the establishment of a virtual French protectorate. Since then the French have been actively engaged in extending their authority over the region to the north, so as to bring Dahomey into touch with their possessions in the Sudan. In 1897–98 they concluded treaties with the Germans and the English and the sphere of influence claimed by each was determined. The boundary question settled, the French government busied itself with Gallicizing the native population. Village, regional and urban schools were established under the new West African educational system in 1902, and in every way the government undertook to win over the natives. Consult Careb, 'Les territoires africains et les conventions anglaises' (Paris 1901); François, 'Nôtre colonie du Dahomey' (ib. 1906); Le Herissé, 'L'ancien royaume du Dahomey' (ib. 1911).

DAIBUTSU, dī-boo'tsoo, the name given in Japan to a gigantic statue of Buddha. The largest Daibutsu in the empire is found at Nara. It is 53 feet high and supposed to date from the 8th century. The image is shrined in a pagoda. At Kamakura is a bronze Daibutsu over 49½ feet in height. The eyes, which are four feet long, are made of gold.

DAILLÉ, dā-yā', **Jean**, French Protestant theologian: b. Châtelherault, 6 Jan. 1594; d. Charenton, near Paris, 15 April 1670. He became pastor in 1625 of the church at Saumur, and in 1626 of that of Charenton at Paris, where he passed the remainder of his life. He was one of the ablest and most learned divines of his day, and did essential service to the Protestant cause by several works, among which the most celebrated is entitled 'Traité de l'emploi des SS. Pères pour le jugement des différends de la religion' (1632). It was also published in Latin and translated into English, and in both forms has had a very extensive circulation both in England and on the Continent. It aims to show that the authority of the fathers has been far too much overvalued, and that the ignorance or inaccuracy apparent in almost all their works unfit them for the establishment of any doctrine not clearly laid down in Scripture. He also wrote distinct treatises on several of the leading points of controversy between Protestants and Roman Catholics.

DAIMIEL, dī-mē-ēl', Spain, town in the province of Ciudad Real, about 20 miles east-northeast of the city of that name on the Azuer River. It is well built; the principal edifices are two parish churches, the one Gothic, the other Doric, and both surmounted by towers. The manufactures consist chiefly of linen and woolen fabrics and lace, soap, liquors and bricks. Pop. 15,940.

DAIMIOS, dī'mē-ōz, a class of feudal lords formerly existing in Japan, but now deprived of their privileges and jurisdiction. As long as their feudal possessions remained to them, they exercised in their own domains the rights of petty rulers, and 18 of them were to all intents and purposes independent; a circumstance which greatly limited the power of the Mikado, and formed a hindrance to the career of progress and reform on which Japan had entered. In order to centralize the power of the government, a decree was issued on 12 Aug. 1871 by which the daimios were deprived of all rights of sovereignty, their districts incorporated with the Imperial territories, and their troops handed over to the Imperial government. At the same time a new constitution and organization were given to the state. A deliberative assembly, consisting of two chambers, was created, to which deputies were sent by the former feudal governments or districts of the daimios (Han); and the daimios themselves were made official governors of those districts which they previously held as feudal rulers, and were placed upon a salary hereditary in their families. Their salaries now equal one-tenth of their former income. See SAMURAI.

DAIMLER ENGINE. See INTERNAL COMBUSTION ENGINE.

DAIQUIRI, dă-ē-ke-ree', Cuba, town 15½ miles southeast of Santiago, on the southern coast, noted for the successful landing of the American army of invasion (excepting Kent's division), 22 June 1898. See UNITED STATES — THE WAR WITH SPAIN.

DAIRCELL, Saint, said to have lived in Kerry, Ireland, in the 7th century. The legend is that he was the illegitimate son of a husbandman, and that the mother sought to kill the child at birth. A fluttering white dove, which seemed to descend from heaven, stayed her hand, and saved the life of the babe.

DAIRY CATTLE. See CATTLE.

DAIRY CHEMISTRY. See AGRICULTURAL CHEMISTRY.

DAIRY FARMING. See FARM MANAGEMENT.

DAIRY INDUSTRY, American. Compared with other farming and agricultural industries in the United States, dairying is of considerable import and shows great development during the last two or three decades; in fact each decade far outstrips the preceding in every line of the industry. According to government statistics, the leading dairy States are New York, Wisconsin, Pennsylvania, Illinois, Iowa, Ohio, Minnesota, Michigan, California, Indiana, Massachusetts and Missouri. Butter is made extensively in all these States, but Wisconsin, New York, Michigan, Ohio and Pennsylvania are the heaviest producers of cheese, the varieties including many imitations of foreign cheese. Dairy farms are developing rapidly in sections where wheat and other "general" crops have become unprofitable. Recently the industry has made great progress in the Pacific Coast States and in the Southern States. It has been proved that cows can be kept and good butter and cheese can be made in almost any district where suitable coarse fodder can be produced. It is often possible to grow more abundant and better fodder crops than are furnished by the natural grasses. Well or cistern water may take the place of the flowing spring. Favorable freight rates and fast refrigerator-car transportation lines have the effect of placing the distant dairyman near the markets where grains can be purchased and his products can be disposed of to the best advantage. Dairying seems to be the one branch of agriculture least affected by conditions of soil and climate.

Dairying has advantages over many other kinds of farming. It improves the land instead of wearing it out, because the products of the dairy which leave the farm permanently are not rich in plant food, as is the case with field crops, and it provides fertilizer in the form of manure, which is of immense value for enriching poor soil. It furnishes a profitable way of using certain farm products, such as grass and straw, that otherwise would be valueless. It provides cheap by-products in the form of skimmed milk, buttermilk and whey, which can be made into human food or very profitably fed to calves and other animals. It can be combined with other forms of agriculture. Perhaps best of all, it engages the farmer in paying work for the entire year. For these reasons the general appearance of any section where dairying is extensively followed shows thrift and progress. The growth of the dairy industry is sometimes checked temporarily by unfavorable economic conditions, such as high cost of feeds and high prices of beef.

The United States census for 1910 and estimates for 1917, made by the Dairy Division, United States Department of Agriculture, give the following dairy statistics:

Cows on farms and ranges (1910)	21,801,000
Cows in towns and cities (1910, est.)	1,000,000
Total cows in the United States (1910)	22,801,000

Census report for 1910:

Total milk produced in the United States, gallons (1910)	7,466,406,384
Butter made on farms, pounds (1910)	994,650,610
Butter made in factories, pounds (1910)	627,145,865
Total butter made, pounds	1,621,796,475
Cheese made on farms, pounds (1910)	9,405,864
Cheese made in factories, pounds (1910)	311,175,730
Total cheese made, pounds	320,581,594
Total dairy products factories, 1910	8,479
Total dairy products factories, 1914	7,982
Average yield of milk per cow in United States, gallons (1910)	362

Dairy Division estimates for 1917:

Number of cows required to supply the various dairy products:	Cows
Milk for consumption as milk	9,813,008
Butter (at 177 pounds, per cow, per year)	9,334,880
Cheese (at 371 pounds, per cow, per year)	1,138,400
Ice cream	842,416
Condensed milk	660,272
Milk for dairy calves	979,024
Total dairy cows on farms, est.	22,768,000

The number of cows in towns and cities is estimated at about 1,500,000.

The aggregate annual value of dairy products is estimated to exceed $500,000,000 for the year 1900, while in 1910 the value, exclusive of home consumption, was $656,301,246. Exports of dairy products, with the exception of cheese and condensed milk, have always been small. Exports of cheese gradually increased from about 5,000,000 pounds in 1850 to 150,000,000 in 1880, when they amounted to one-half of the production. From that date they gradually declined until 1915, when they again reached the low ebb of 1850. War orders for cheese commenced in 1915 and by 1917 exports reached 66,000,000 pounds. Exports of condensed milk have not been a very important item in our foreign trade in dairy products. In 1910 they amounted to about 13,333,333 pounds. The war caused a very great increase, however, and in 1916, exports totaled about 160,000,000, and in 1917 about 260,000,000 pounds. The demands of foreign markets differ somewhat from domestic requirements, but the fact that butter and cheese which will satisfy foreign tastes can be supplied from this country has been proved many times by the experience of exporters as well as by trial shipments made by the Department of Agriculture. There are great possibilities for American dairy products in other countries, and these will be developed as soon as our production is permanently in excess of our needs. The annual exports of butter have exceeded 25,000,000 pounds but twice since 1900, and those of cheese had not reached 50,000,000 since 1900, except for the years 1915 and 1917, due to conditions arising from the European War.

The quantities and values of imports, exports, and re-exports of dairy products for the years 1910, 1912, 1914, 1916 and 1917 are as follows:

UNITED STATES IMPORTS AND EXPORTS OF DAIRY PRODUCTS

BUTTER

FISCAL YEAR	General imports		Domestic exports		Re-exports	
	Pounds	Value	Pounds	Value	Pounds	Value
1910	1,360,245	$298,023	3,140,545	$785,771	10,194	$2,551
1912	1,025,668	237,154	6,092,235	1,468,432	40,151	6,953
1914	7,842,022	1,753,461	3,693,597	877,453	51,935	11,835
1916	712,998	212,370	13,487,481	3,590,105	21,265	6,391
1917	523,573	192,767	26,835,092	8,749,170	2,610	716

CHEESE

FISCAL YEAR	General imports		Domestic exports		Re-exports	
	Pounds	Value	Pounds	Value	Pounds	Value
1910	40,817,524	$7,053,570	2,846,709	$441,017	138,754	$26,088
1912	46,542,007	8,807,249	6,337,559	898,035	104,980	18,600
1914	63,784,313	11,010,693	2,427,577	414,124	152,244	27,369
1916	30,087,999	7,058,420	44,394,251	7,430,089	267,201	60,139
1917	14,481,514	4,465,633	66,087,213	15,244,364	169,946	55,718

CONDENSED MILK

FISCAL YEAR	General imports		Domestic exports		Re-exports	
	Pounds	Value	Pounds	Value	Pounds	Value
1910	598,134	$45,253	13,311,318	$1,023,633	None	None
1912	698,176	49,955	20,642,738	1,651,879	"	"
1914	14,599,339	1,005,500	16,209,082	1,341,140	"	"
1916	18,174,505	1,399,840	159,577,620	12,712,952	"	"
1917	18,375,698	1,462,468	259,102,213	25,129,983	"	"

See Milk and Cream Tables for 1916 and 1917 re-export figures.

CASEIN

FISCAL YEAR	General imports		Domestic exports		Re-exports	
	Pounds	Value	Pounds	Value	Pounds	Value
1910	3,769,476	$304,001	No record found		No record found	
1912	9,138,338	830,845	"		"	
1914	10,798,614	705,264	"		"	
1916	10,376,641	984,899	"		"	
1917	12,319,111	1,843,492	"		"	

UNITED STATES IMPORTS AND EXPORTS OF DAIRY PRODUCTS—*Concluded*

Fiscal Year	Milk and Cream									
	General imports				Domestic Exports		Re-exports	Total value		
	Milk, fresh		Cream				Foreign milk, cream and condensed milk.			
	Gallons	Value	Gallons	Value	Gallons	Value	Value	General imports	Domestic exports	Re-exports
1910...	140,492	$18,243	731,375	$577,335	Not reported	Not reported	....	$8,296,425	$2,250,421	Not found
1912...	46,823	6,282	1,120,240	923,786	"	$244,913	....	10,855,271	4,263,259	"
1914...	607,848	80,939	1,773,113	1,549,604	"	333,217	....	16,105,461	2,965,934	"
1916...	891,931	115,614	1,193,911	1,042,775	"	835,106	$709,061	10,813,918	24,568,252	$775,591
1917...	....	283,978	743,819	666,267	"	283,467	833,344	8,914,605	49,406,984	889,778

The best and most profitable breed of dairy cattle has as yet never been agreed upon. Each of the dairy breeds has strong claims to highest merit and each has its enthusiastic advocates. The latter are often influenced by conditions which have no economic importance. The breeds differ markedly in such characteristics as size, color and disposition, as well as in quantity and quality of milk. As a general rule, when a large amount of milk is given, it is low in fat-content or "richness." The data shown in the following table regarding several leading dairy breeds of cattle have been compiled from Advanced Registry records.* The figures of production and composition of milk are averages based on the number of cows given.

There is a wide variation in the milk production among cows of the same breed. Yields of milk above 30,000 pounds a year have been produced and the world's record of butterfat production at present is 1,205.09 pounds. These records of milk and butterfat production were all made by pure-bred cows.

The great majority of dairy cows throughout the country are "grades," that is, some of their ancestors are pure bred and some are not. As producers of milk, individual grade cows can be selected that will equal pure breds, but the latter are more satisfactory for breeding purposes. A grade Holstein cow in Michigan, in 1917, gave 9,139 pounds of milk containing 298 pounds of butterfat, equivalent to 351 pounds of butter. The total feed cost of the year was $73.39 and the total value of her products was as follows:

351 pounds of butter @ 40 cents per lb	....	$140.40
7,736 " skim milk @ 40 cents per cwt	.....	30.94
1,105 " buttermilk @ 25 cents per cwt	....	2.75
Total	....	$174.09

The income over cost of feed was $100.70, while the feed cost of one pound of butter was $0.209.

The average dairy cow in the United States produces about 4,000 pounds of milk, containing about 160 pounds of butterfat, equivalent to 188 pounds of butter.

188 pounds of butter @ 40 cents per lb	....	$75.20
3,360 " skim milk @ 40 cents per cwt	.....	13.44
480 " buttermilk @ 25 cents per cwt	...	1.20
Total	....	$89.84

The cost of feed for such a cow would be about $60 and the income over cost of feed about $29.84, as compared with $100.70 for the grade cow previously mentioned.

Milk of the cow is secreted in the mammary glands known as the udder. Wing thus well describes the udder of a good cow: "It should be large and well developed; it should occupy the whole space between the hind legs, extending well up between the thighs and well forward upon the belly. It should be held firmly against the wall of the abdomen. It should be level or nearly so on the bottom, and the four quarters should be as nearly as possible equally developed and each furnished with a cylindrical perpendicular teat of moderate length. The whole organ should diminish rapidly in size, as the milk is withdrawn. The hair upon the udder should be fairly abundant, fine and soft, and abundantly supplied with brownish dandruff." As milk is a product of the blood, the importance of an ample blood supply to the udder, a vigorous constitution, and a strong circulation is readily seen. It is highly important to withdraw the milk from the udder regularly, quietly and completely, if the flow is to be maintained.

Van Slyke gives the average of 5,552 American analyses of cow's milk, expressed in percentages, as follows:

Water	Total solids	Fat	Casein	Albumin	Sugar	Ash
87.10	12.90	3.90	2.50	0.70	5.10	0.70

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*Farmers' Bulletin 893

Breed	Number of cows	Pounds of milk for a year	Butterfat	
			Per cent	Pounds a year
Ayrshire [1].........	2,598	9,555	3.95	377.51
Brown Swiss [2].....	199	10,868.7	3.995	433.45
Guernsey [3]........	6,200	8,934.44	4.99	446.01
Holstein-Friesian [4].	3,220	14,622.7	3.424	500.7
Jersey [5]...........	5,244	7,792	5.35	417.0

[1] Records completed to 1 July, 1917. [2] Records completed to June, 1917. [3] Records completed to 15 Aug. 1917. [4] Records completed to 19 Feb. 1917. [5] Records completed to 16 Feb. 1917.

BREED	Number of analyses	Water	Total solids	Solids not fat	Fat	Casein	Milk sugar	Ash	Nitrogen	Daily milk yield
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Pounds*
Ayrshire	252	86.95	13.06	9.35	3.57	3.43	5.33	0.698	0.543	18.40
Devon	72	86.26	13.77	9.60	4.15	3.76	5.07	.760	.595	12.65
Guernsey	112	85.39	14.60	9.47	5.12	3.61	5.11	.753	.570	16
Holstein-Friesian	132	87.62	12.39	9.07	3.46	3.39	4.84	.735	.540	22.65
Jersey	238	84.60	15.40	9.80	5.61	3.91	5.15	.743	.618	14.07

In addition to the constitutents named certain others are present in minute quantities. The average specific gravity of milk is 1.032. The composition of milk of different cows varies between wide limits. The same may be true of the product of any individual cow from day to day. The New York Agricultural Experiment Station is authority for the above averages of analyses of milks from cows of different breeds.

Koenig gives variations of milk constituents in about 800 samples, expressed in percentages, as follows:

	Maximum	Minimum
Water	90.69	80.32
Fat	6.47	1.67
Casein	4.23	1.79
Albumin	1.44	.25
Sugar	6.03	2.11
Ash	1.21	.35

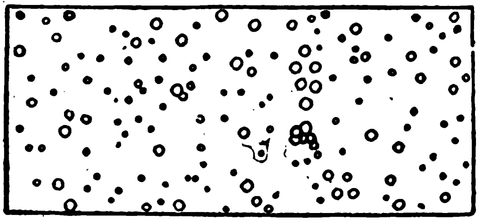
In some instances American analyses have shown even wider variations.

The most variable constituent of milk is fat. By it the «richness» of milk is judged and the commercial value is determined. Milk fat is a complex mixture containing several glycerine compounds. It is present in the form of minute globules suspended in the remaining or watery portion called the serum. The globules average about one ten-thousandth of an inch in diameter and are plainly visible under a high-power microscope. About 150,000,000 of them are contained in a single drop of milk. Some conditions affecting fat-content of milk have been mentioned. A few others are important. From about the middle to the last of the period of lactation, the fat in milk increases slightly. The percentage of fat increases gradually from the first to the last of any milking; the first milk drawn contains about 1 per cent fat and the last as high as 9 or 10 per cent. It is popularly supposed that the feed given a cow has a decided influence on the quality of her milk. As a matter of fact, the milk of a cow in normal condition is little affected by the feed, except that certain feeds may give it a strong flavor. Feed has a much greater influence upon the quantity of milk than its quality.

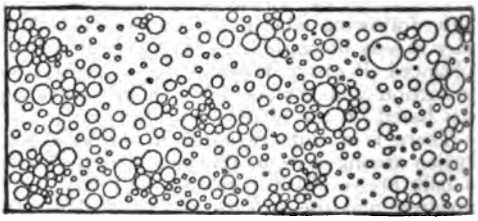
Casein and albumin are protein or nitrogen constituents of milk. The former is coagulated by rennet or acid, the latter by heat. Coagulated casein or «curd» enters largely into the composition of cheese. Casein is said to be in a state of «pseudo-solution» in milk. Milk sugar or lactose is in solution in milk. When separated it resembles powdered sugar. It is less sweet than cane sugar and is used to a considerable extent in druggists' preparations and in certain proprietary foods. The mineral matter in milk, called ash or salts, is the part remaining when milk is evaporated to dryness and burned. It includes phosphorus, potassium, calcium, chlorine, magnesium, sodium, sulphur and iron. Certain gases and other constituents are present in milk in minute quantities.

DIFFERENT GRADES OF MILK (MAGNIFIED 300 TIMES).

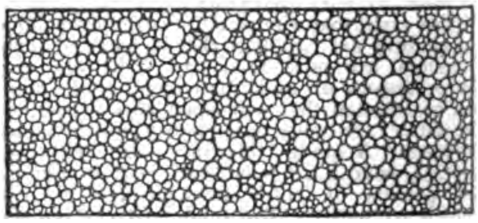
a. Skimmed milk.



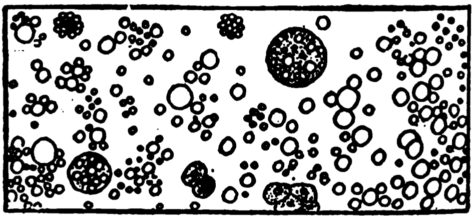
b. Milk.



c. Cream.



d. Colostrum.



The first milk given after parturition is called colostrum. It differs in composition from normal milk, and is fit only for food for the newly born calf.

The only precise method of determining the quality of milk is by a complete gravimetric analysis, but for practical purposes the knowledge of the specific gravity of milk and its fat content is usually sufficient. The specific gravity can be ascertained quickly by the use of a lactometer, and the fat content can be quite accurately determined by the use of the Babcock test. In making this test, a definite amount of milk is mixed with sulphuric acid in a special bottle having a graduated neck. This is whirled rapidly in a machine and the fat is separated from the rest of the mixture by centrifugal force. By the addition of water heated to about 130° F. the fat is brought up into the neck of the bottle, where its exact percentage can be read. Simple tests have been devised for determining the acidity of milk, and whether or not it has been heated.

Milk is a very delicate product and is subject to taints and changes in great number. It readily absorbs strong odors with which it comes in contact, and objectionable flavors are easily imparted to it when the cows are allowed to eat certain foods within a few hours before milking. The flavors caused by garlic and ragweed are well known; rape and green rye are said to produce bad flavors in the milk when they are fed in certain conditions. Flavors due to the causes named are most noticeable when the milk is first drawn from the udder, and may be largely reduced by aeration or the exposure of milk to the air.

When held, milk undergoes many kinds of changes. The most common is souring, but it may become slimy or "ropy," curdle without souring, become "soapy," turn to a red, blue or other color, develop peculiar and disagreeable odors, form poisonous products, or become altered in other ways. Most of these changes are directly due to bacteria, but some are caused by enzymes or unorganized ferments.

Bacteria find in milk an exceptionally favorable medium for growth. They enter milk in so many ways that it is a practical impossibility to produce milk which is germ-free. But the character and number of the bacteria that get into milk and their development are largely controllable and have much to do with the success or failure of all operations with milk and its products. Many species of bacteria found in milk are perfectly harmless. Some are essential to certain dairy operations, for example, when it is desired to ripen cream to make butter, lactic acid bacteria are needed; they produce lactic acid from milk sugar and cause the milk or cream to sour. Other species have their peculiar effects in the ripening processes of the various forms of cheese. Numerous varieties of bacteria are objectionable and some are dangerous. The latter include pathogenic bacteria and other forms that may be the direct or indirect cause of disease to the consumer. Well authenticated cases are on record of typhoid fever, diphtheria and other disease germs being carried by milk, and there seems to be proof that tuberculosis is sometimes spread in this manner.

Bacteria are introduced into milk from many sources. As secreted, milk is probably sterile, but it becomes contaminated in the teats of the cow, so that milk as it leaves the udder always has a few bacteria. In some cows this number may run into the hundreds of thousands per cubic centimeter, although more often the count is in the hundreds. After leaving the udder it is subject to external contaminations, the most serious of which from the standpoint of numbers is unsterilized utensils. The next important source of contamination is manure. Stable air ordinarily plays little or no part in introducing large numbers of bacteria into milk. It is possible for the average dairyman on the average farm to produce milk practically free from visible dirt, which when fresh has a low bacterial count, by the use of three simple factors; namely, sterilized utensils, clean cows with clean udders and teats and the small-top pail. To facilitate keeping the cow clean the stable should be kept clean and the cows bedded. It is desirable that the udders and teats be washed before each milking.

High bacterial counts in milk are most frequently due to growth of the organisms in the milk if it is not promptly cooled at least to 50° F. Bacteria multiply rapidly at temperatures above 50° F. and in general the higher the temperature the faster they grow up to 100° F. Milk immediately after production should therefore be cooled quickly and kept cold.

Pasteurization.— Since pathogenic bacteria may be present in milk it is a common practice to heat it to temperatures above 140° F. This process is known as pasteurization. From a sanitary standpoint pasteurization is of greatest value when market milk is under consideration. The pasteurization of milk, when the process is properly performed, destroys the organisms which cause typhoid fever, diphtheria, septic sore throat and dysentery, and offers protection against the foot-and-mouth disease. From an economic standpoint, pasteurization is of value because it increases the keeping quality of milk and prevents financial losses by souring. As practised at present, pasteurization destroys about 99 per cent of the bacteria present in milk, including all disease-producing organisms.

Three processes are commonly used in this country: The first is known as the flash, or continuous process; the second as the holder or holding process; and the third as pasteurization in the bottle. The flash process consists in heating the milk rapidly, usually to 160° F. or above and then cooling quickly. The heating in this process requires only from 30 seconds to one minute. In the holder process the milk is heated to from 145° to 150° F. and held for 30 minutes before being cooled. This is the most commonly used process and is superior to the flash process in every way. Pasteurization in the bottle is one of the latest developments in the process to be used on a practical scale. In this process the milk is bottled, then heated in the bottles to from 145° to 150° F., then held for 30 minutes before being cooled. In any method of pasteurization the milk after heating is cooled as rapidly as possible to 50° F., and lower when possible.

The temperature recommended for pasteurization is 145° F. for a period of 30 minutes. This temperature and period of holding is the most desirable (1) because it is high enough to destroy pathogenic bacteria; (2) because it leaves in the milk a maximum number of lactic-acid-producing bacteria which cause the milk to sour in a more or less normal manner, although the souring is delayed; (3) because the milk does not undergo any appreciable chemical change; (4) because it has little or no effect on the flavor or on the cream line of milk; and (5) because of the economic advantage of not having to heat the milk to higher temperatures, thereby saving in heating and consequently in cooling.

Cream is pasteurized by the same method as milk, and usually the viscosity of the cream is somewhat reduced. This is particularly true in high-temperature pasteurization. The early objections to pasteurization have been shown by scientific investigation not to be valid, so that the pasteurization of milk and cream is now extensively and in fact very generally practised. It is even compulsory in a large number of cities.

Milk should be produced and handled in such a manner as to keep bacterial contamination as low as possible and prevent subsequent growth. The practical way of accomplishing this is to observe the utmost cleanliness in all stages of production, to cool the milk to at least 50° F. promptly after it is drawn and to hold it continuously at such low temperature. As pathogenic or disease-producing bacteria are the most dangerous of all forms ever found in milk, special care should be taken to exclude them. For this purpose, it is necessary to give close attention to the health of the animals and all persons having to do with the herd or the milk. Some serious outbreaks of disease have been due to the handling of milk by persons suffering only mildly with a contagious disease such as typhoid fever or who have been exposed to the disease. Dairy cows should be examined at least twice every year by a competent veterinarian; some of the best dairies have examinations more often. The milk of a cow suspected of being out of condition or not in good health should not be used. Many bacteria that enter milk are carried by small particles of foreign matter such as manure, dust, dirt, hairs, etc. Of course, these are most abundant in ill-kept barns, where milkers as well as the cows and their surroundings are allowed to be unclean. Barns should be kept thoroughly clean. The use of pine shavings for bedding contributes much to cleanliness and they are now found in many of the best dairies. Barns should be so constructed and the work should be so planned that there would be no occasion for unnecessary dust in the atmosphere at the time of milking. Milch cows should be "groomed" frequently and udders should always be cleaned just before milking with a damp cloth. Milking should be done quietly. Freeman has shown that the milk drawn by a man who agitates the udder violently may contain 10 times as many bacteria as that drawn by a quiet milker. Milk should not be used until it becomes normal after calving. In addition to being in good health and avoiding exposure to contagion, the attendants in a dairy should be personally clean. A special clean suit should be put on and hands should always be thoroughly cleaned before milking. The practice of "wet" milking is extremely filthy. All dairy utensils should be simply constructed and easily cleanable. They should not be made of any open or porous material such as wood. Immediately after use they should be cleaned and then sterilized for five minutes with steam. Milk should be promptly removed from the stable, strained, cooled and cold-stored. It should be handled in a room specially fitted for the purpose — clean and light. A good form of strainer is provided with a double thickness of sterile cheese-cloth filled between with pure white sterile cotton. The cloth and cotton should be changed as often as they commence to show dirt near the lower surface. The usual cooling device consists of an apparatus made of thin metal and so arranged that cold water is on one side while the milk being cooled passes over the other. With certain forms of coolers, it is found entirely practicable to reduce the temperature of the milk quickly to within 2 to 4 degrees of the temperature of the water. After cooling, milk should be placed in cans or jars, as may be required and held at a low temperature continuously until used. When milk is to be used for butter and cheese making it is also necessary for it to be held at low temperatures to prevent undesirable fermentations.

Items that need to be kept in mind and conditions which should be observed in the management of a first-class dairy are summarized in "Twenty Dairy Suggestions," issued by the United States Department of Agriculture, as follows:

THE COWS

1. Have the herd examined at least twice a year by a skilled veterinarian. Promptly remove animals suspected of being in bad health. Never add an animal to the herd until certain it is free from disease, particularly tuberculosis.

2. Never allow a cow to be excited by fast driving, abuse, loud talking, or unnecessary disturbance; do not expose her to cold or storms more than necessary.

3. Clean the entire body of the cow daily; hair in the region of the udder should be kept short by clipping.

4. Do not allow any strong-flavored food, like garlic, cabbage or turnips, to be eaten except immediately after milking. Changes in feed should be made gradually.

5. Provide fresh pure water in abundance, easy of access and not too cold.

THE STABLES

6. Dairy cattle should be kept in a stable, preferably without cellar or storage loft, and where no other animals are housed.

7. The stable should be light (4 square feet of glass per cow) and dry, with at least 500 cubic feet of air space per animal. It should have air inlets and outlets, so arranged as to give good ventilation without drafts of air on cows.

8. The floor should be tight and constructed preferably of cement; walls and ceilings should be tight, clean, free from cobwebs and whitewashed twice a year. Have as few dust-catching ledges, projections and corners as possible.

9. Allow no dusty, musty, or dirty litter, or strong-smelling material in the stable. Haul manure to field daily, or store under cover at least 40 feet from stable. Use land plaster daily in gutter and on floor.

MILK HOUSE

10. Have a light, clean, well-ventilated and screened milk room, located so as to be free from dust and odors.

11. Milk utensils should be made of metal, and all joints smoothly soldered. Never allow utensils to become rusty or rough inside. Use them only for handling, storing or delivering milk.

12. To clean dairy utensils, use only pure water. First rinse the utensils in warm water. Then wash inside and out in hot water in which a cleansing material has been dissolved, and rinse again. Sterilise with boiling water or steam. Then keep inverted in pure air and sun, if possible, until wanted for use.

MILKING AND HANDLING MILK

13. Use no dry, dusty food just previous to milking.

14. The milker should wash his hands immediately before milking, and milk with dry hands. He should wear a clean outer garment, kept in a clean place when not in use. Tobacco should not be used while milking.

15. Wipe the udder and surrounding parts with a clean damp cloth immediately before milking.

16. In milking be quiet, quick, clean and thorough. Commence milking at the same hour every morning and evening, and milk the cows in the same order.

17. If any part of the milk is bloody, stringy or unnatural in appearance, or if by accident dirt gets into the milk pail, the whole should be rejected.

18. Do not fill cans in the stable. Remove the milk of each cow at once from the stable to milk room. Strain immediately through cotton flannel or cotton. Cool to 50° F. as soon as strained. Store at 50° F. or lower.

19. Never mix warm milk with that which has been cooled, and do not allow milk to freeze.

20. A person suffering from any disease, or who has been recently exposed to a contagious disease, must remain away from the cows and the milk.

The successful management of a dairy requires great intelligence, patience and persistence, and no person should expect to succeed in this business unless he has a decided liking for it. Of course the matter requiring first attention is the location of the farm. The elevation and conformation of the land should be such that good air and drainage would obtain. There should be an abundant supply of pure water. For this purpose a well-protected spring or deep well is best, and care should be taken to have it located distant from buildings and other possible sources of contamination. Barns and dairy buildings should stand on elevated ground, and they should be isolated from other structures. It is well to store all forage in a building separate from the cow stable. By a system of overhead tracks and suspended cars, feed can be easily brought to the herd and manure economically removed. Unless the manure can be spread at once upon the land, it should be stored under a roof. The stable should be planned to facilitate the work of caring for the herd. Light and fresh air are necessary and should be admitted in abundance. It is generally advised that there be allowed at least one cubic foot of space for every pound of live weight. Where the winters are not too cold and expense of construction must be kept low, the cows may be allowed to stand on the ground, the floor of the barn being made from hard-packed clay or earth. Better floors are made from planks treated with tar and laid close together. A cement floor is the best, but because of its hardness an abundance of bedding must be used. The stalls should be from 3½ to 4 feet wide and just long enough for the manure gutter to be immediately back of the hind feet when the cow is standing. Many devices for tying cows have been proposed, but one of the most satisfactory is the stanchion attached above and below by a few links of chain, so as to allow some freedom of motion in all directions. A separate feeding-box for each animal is objectionable because of the difficulty of keeping it clean. At many of the best dairies the cows are fed on the floor, a long shallow trough in front of the stalls being constructed for this purpose. Provision should be made for frequent access to water. Milch cows should be allowed to go out doors every pleasant day for exercise.

The selection of cows for a dairy herd, regardless of the breed chosen, should be based upon individual merit. Small and unprofitable producers as well as unhealthy cows and those of weak constitution should be avoided, and when they are found in the herd advantage should be taken of the first opportunity to displace them. It is well said “the bull is half the herd.” When calves are to be raised, as is the rule in most dairies, the influence of the bull upon the development of the herd is readily seen. If possible a bull of proved excellence should be used. It is always well to give special attention to the breeding of the bull and attach considerable importance to the performances of his dam and grand-dams. The quantity of milk given by each cow, and its fat test, should be recorded at least one day each month for the purpose of showing which animals of the herd are profitable and which are not. The time for breeding cows depends upon the requirements for milk. Formerly it was a general practice in dairies not supplying milk for retail sale to have cows calve in the spring and be “dry” throughout the winter. At present, however, a large number of dairies are operated most profitably during the winter for the purpose of supplying milk for butter and cheese making, as well as for consumption in towns and cities.

Feeding for best results is a subject which requires much study and experience. Especially is this the case where winter dairying is practised. In the first place feed should be wholesome and palatable. Then care should be taken to have the nitrogenous and non-nitrogenous components properly proportioned. Just what feeds will be used depends largely upon local conditions, cost, availability, etc. The following rules given in Farmers' Bulletin 743 may be followed in most cases, but the practical feeder will study carefully the needs of each individual animal in the herd.

1. Under most circumstances the cow should be fed all the roughage that she will eat up clean, adjusting the grain ration to the milk production. Only when the cow tends to become overfat should the quantity of roughage be restricted.

2. A grain mixture should be fed in the proportion of 1 pound to each 3 pints or pounds of milk produced daily by the cow, except in the case of a cow producing a flow of 40 pounds or more, when the ration can be 1 pound to each 3½ or 4 pounds of milk. An even better rule is 1 pound of grain each day for every pound of butter-fat produced during the week by the cow.

3. Feed all the cow will respond to in milk production. When she begins to put on flesh, cut down the grain.

Milk is a food of great value. Next to bread and water it is used more commonly than any other article of food or drink. It contains, in easily digestible form, the four kinds of nutrients required by the body — protein, fats, carbohydrates and mineral matter. It contains more nutritive matter than can be obtained at the same cost in any other animal food. Jordan has shown the economy of using milk in the family dietary. The increased use of good wholesome milk is strongly recommended. Skimmed milk also contains considerable food value and could well be used as a human food much more than is the present custom. The average amount of milk consumed daily in cities and towns is about 0.7 pint per capita, and to supply this there must be within easy reach one cow for about every 12 persons. Many cows are kept within corporate limits and their product is delivered twice daily — often “warm from the cow.” For best results it should be cooled promptly, but it is often used before any considerable change takes place. Most of the milk supply of small and medium-sized towns and a large portion of the milk used in cities is taken from the dairy to the consumer by teams, and the general rule is to serve in the morning the product of the same morning and the previous evening.

The bulk of milk used in large cities is transported by special trains, and sometimes these originate as far as 200 to 300 miles from their destination. "Train" milk is from 12 to 72 hours old when delivered to the consumer. Most of it is either 24 or 36 hours old. Producers, dealers and shippers have learned that milk so long delayed must receive good care, and it often happens that this milk is finally delivered in better condition than milk not so old but neglected. The receipts of milk in New York city are more than 2,700,000 quarts daily, and practically all is brought by trains. Milk usually is transported in heavy tin cans holding 8½, 20, 32 or 40 quarts. In recent years bottles have come into general use. Some concerns maintain bottling stations near the producing farms, and their product is shipped in glass jars which are packed in cracked ice during hot weather. Much milk is bottled in the cities before delivery.

Farmers lately have received 5 to 7 cents per quart for their milk. City retail prices range from 10 to 14 cents per quart. Most milk is delivered promptly after it reaches the city. When it must be held before delivery a clean cold place must be provided for this purpose.

Much is being done by State and municipal governments to improve market milk, but the greatest influence to this end that can be produced is a determined demand on the part of the consumers for pure milk and a willingness to pay for it. Medical milk commissions in some cities are entitled to credit for good results already obtained. Some concerns produce a special grade of milk. It is their aim to produce milk in a scientific manner and to take every reasonable measure to insure its purity. One of them operates in 16 different cities and conducts dairies which are models in cleanliness and management. The same company has developed a large trade in "modified milk," which is milk altered in its composition according to the peculiar requirements of infants and invalids, and specially prepared upon physicians' prescriptions. Kumiss is one of the forms of fermented milk used as a beverage. It is produced with the aid of yeast. Bulgarian milk is a sour milk ripened by a bacterium, Bacterium bulgaricum. This organism is able to produce a high percentage of acid, and the Bulgarian milk is therefore usually of a higher acidity than normally soured milk. Bulgarian milk has become rather popular since Metchnikoff suggested that it may be beneficial to health and therefore possibly a means by which to prolong life. Bulgarian milk is often sold under various names, such as Fermilac, Yougert, Morilac, etc. Ice cream is rapidly becoming one of the more important dairy products. It is estimated that the ice cream output in the United States for the year 1917 amounted to 210,000,000 gallons. This at $1 per gallon represents an industry of $210,000,000. Ice creams are known under different names, such as plain ice cream, parafaits, mousses, etc. No classification has up to this time been accepted officially. It has been customary to distinguish between two classes of ice creams, "Philadelphia," an ice cream made without the addition of eggs, and "Neapolitan," an ice cream containing eggs.

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DAIRY PRODUCTS. The dairy industry is one of the most important branches of farming in this country, both from the standpoint of production of food for human consumption and, also, that of soil fertility. The size of this industry is indicated by the fact that, on 1 Jan. 1917, there were 22,768,000 milch cows in the United States, having a farm valuation of $1,358,435,000. The following are the States which had more than 1,000,000 cows in 1917: Wisconsin, 1,750,000; New York, 1,539,000; Iowa, 1,405,000; Minnesota, 1,302,000; Texas, 1,175,000; Illinois, 1,057,000. The amount of milk produced on farms in 1909 was 5,813,699,474* gallons, and the total value of the dairy products was reported as $596,413,463*. The following table shows the amounts and value of the different manufactured dairy products for the year 1914:

PRODUCT	Pounds	Value
Butter	769,809,781	$218,021,690
Cheese	370,278,599	50,377,018
Condensed milk	873,410,504	58,747,252
Powdered milk	20,454,051	1,968,259
Casein	18,570,220	977,770
Milk sugar	4,051,320	400,613

New York leads all the States in the production of milk for direct consumption. Wisconsin produced the most butter, followed by Minnesota, Iowa and California. In the production of cheese, Wisconsin leads, followed by New York, Pennsylvania and Michigan. For condensed milk, the leading States are Wisconsin, Illinois and New York.

For many years the dairy industry has increased steadily and quite rapidly. This growth is the more significant in view of the fact that, during recent years, there has been a decided decrease in the raising of cattle for beef. This general tendency toward an increase in the raising of dairy cattle at the expense of other kinds is, doubtless, due to certain fundamental economic principles: (1) A given amount of feed consumed by a dairy cow will produce a much greater amount of human food (milk, butter or cheese) than would be produced if it were used for the production of beef, mutton or pork; (2) the sale of milk, butter or cheese removes very little fertility from the farm, and the cow provides a means for converting certain farm products, such as hay, corn, stover, straw, etc., into more salable products; (3) it is easier to maintain the fertility of the soil where stable manure is available than where it is not; (4) labor on a dairy farm is more constant throughout the year than in most other lines of farming. This makes it possible for the dairyman to use both man and team labor economically, and provide a nearly uniform income throughout the year, instead of having it concentrated into a few months, as in grain or fruit-growing. It is significant that the dairy industry has reached its greatest development in those sections of the country which have been farmed longest and where the types of farming have become most permanent and also that there is a marked tendency toward greater development of this industry in the newer sections. This may be interpreted as meaning that the dairy cow grows in importance with the increase of population, need for human food and the development of a permanent type of farming. During recent years, the number of dairy cows has increased in all sections except the New England and Middle Atlantic States, where the industry was already well developed. The market for our dairy products is chiefly domestic, a very small percentage going into export trade.

Milk.— Milk is produced by the females of all species of mammals as food for their young. In nature the mother produces only the amount of milk needed to feed her young, but, in the case of the cow, the function of milk secretion has been developed by means of artificial breeding and selection far beyond the needs of the young calf in order that it may be available for human food. In appearance cow's milk is a yellowish white, slightly viscous, opaque fluid, having a pleasant, sweetish taste. Milk is a true secretion, the fat, casein, lactose, etc., being made by the activity of the cells in the mammary gland.

The analysis of several thousand samples of cow's milk shows the average composition to be as follows: water, 87.17 per cent; milk-fat, 3.69 per cent; casein, 3.02 per cent; albumin, 0.53 per cent; milk-sugar, 4.88 per cent; and ash, 0.71 per cent.

The constituents of milk, less the water, are usually called the ***milk solids*** or ***total solids,*** and the total solids without the fat, the ***solids-not-fat.*** The entire milk, less the fat, is called the ***milk serum,*** or skim-milk.

Some of the constituents of milk are in true solution; some are simply held in suspension, while others are partly in solution and partly in suspension. Van Slyke states this condition as follows:

Milk constituents in true solution in milk serum	Milk constituents partly in solution and partly in suspension or colloidal solution	Milk constituents entirely in suspension or colloidal solution
(a) Sugar	(a) Albumin (1)	(a) Fat
(b) Citric acid	(b) Inorganic phosphates	(b) Casein
(c) Potassium		
(d) Sodium	(c) Calcium	
(e) Chlorine	(d) Magnesium	

The constituents of milk vary considerably in percentage, being influenced by the breed, period of lactation, individuality and certain other minor conditions. The greatest variation occurs in the per cent of fat. The influence of breed upon this constituent and the total solids as compiled by Wing from a large number of analyses by American experiment stations is as follows:

	Solids	Fat
Jersey	14.70	5.35
Guernsey	14.71	5.16
Devon	14.50	4.60
Shorthorn	13.38	4.05
Ayrshire	12.61	3.66
Holstein-Friesian	11.85	3.42

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* Exclusive of milk and cream consumed on farms where produced. If these amounts were included, both these figures would be increased materially.

The per cent of fat normally increases with the advance of the lactation period. This is shown by the following monthly averages for nearly 100 lactation periods (Van Slyke):

MONTH OF LACTATION	Per cent of fat in milk	Percentages in comparison with first month
1	4.30	100.0
2	4.11	95.6
3	4.21	97.9
4	4.25	98.8
5	4.38	101.9
6	4.53	105.3
7	4.57	106.3
8	4.59	106.8
9	4.67	108.6
10	4.90	114.0
11	5.07	118.0

Milk-fat or butter-fat, as it is sometimes called, is not a single chemical substance, but is made up of a number of fatty acids or glycerides. Browne gives the composition of milk-fat as follows, with the percentage of each of the fatty acids:

FATTY ACID	Per cent of total fat
Oleic	33.95
Palmitic	40.51
Myristic	10.44
Stearic	1.91
Dioxystearic	1.04
Butyric	6.23
Lauric	2.73
Caproic	2.32
Caprylic	0.53
Capric	0.34

Babcock gives the following substances as constituting the proteids of milk: Casein, 3.0 per cent; albumin, 0.6 per cent; lactoglobulin, galactin and fibrin (trace), 0.2 per cent; a total of 3.8 per cent. Likewise the mineral matter or ash is made up of many distinct substances as shown by Babcock:

Ash, 0.7 per cent	Potassium oxide	0.175
	Sodium oxide	0.070
	Calcium oxide	0.140
	Magnesium oxide	0.017
	Iron oxide	0.001
	Sulphur trioxide	0.027
	Phosphoric pentoxide	0.170
	Chlorine	0.100

Colostrum is the milk which a cow produces immediately after parturition. It is quite different in appearance and composition from normal milk, having a reddish yellow color and a viscous, almost slimy, consistency. Richmond gives its composition as follows: Water, 71.69; fat, 3.37; albuminoids: casein, 4.83, albumen, 15.85; sugar, 2.48; and ash, 1.78 per cent. Colostrum acts as a purgative to the newly-born calf, and should not be used for human food under four or five days after calving, by which time it becomes normal milk.

Until recent years, it was supposed that the composition of milk could be decidedly changed by the feed which the cow consumed, but later investigation has established the fact that the feed has but slight, if any, influence on the relative amounts of the various constituents. Certain feeds, however, may affect the quality of the milk fat; for example, linseed or gluten meal makes an oily, soft fat, while cotton seed meal and wheat bran make a hard fat. The fat exists in milk in the form of minute globules which are held in their spherical form by the surface tension of the liquid fat and the viscous nature of the milk serum. Since the value of milk is largely proportional to its per cent of fat, it is often necessary to determine its fat content. This may be done by chemical analysis but this method involves considerable time and expense and the method generally used in commercial work in this country is that devised by Dr. S. M. Babcock, of the University of Wisconsin, and known as the "Babcock Test" for milk-fat. This test is based on the principle of liberating the fat globules by dissolving the casein with strong sulphuric acid and the separation of the fat by centrifugal force — the fat being lighter than the other elements in the milk. Briefly, the method of making the Babcock Test is as follows: (1) Secure an accurate sample of the milk to be tested; (2) measure out 17.6 cubic centimeters, and place it in the test bottle; (3) add 17.5 cubic centimeters of sulphuric acid, and mix thoroughly by rotating the test bottle; (4) place bottles in centrifuge and whirl at proper speed for five minutes; (5) add hot water to bottom of neck and whirl two minutes; (6) add hot water to bring fat up to graduated scale and whirl one minute; (7) place test bottles in water bath at 135°-140° F. for five minutes; (8) read amount of fat column, including meniscus both at top and bottom of column.

Milk is heavier than water, the average specific gravity of normal milk being 1.032, with variations between 1.029 and 1.035. The specific gravity of milk may be determined by an instrument called a "lactometer." Taken in connection with the Babcock Test, the lactometer reading makes it possible to determine both the total solids and the solids-not-fat in any given sample of milk. There are a number of formulæ which may be used for this purpose. Babcock's modified form is as follows:

$$\tfrac{1}{4}L + .2F + .14 = S.\,n.\,F.$$

in which L stands for the lactometer reading and F for the per cent of fat. The total solids may be obtained by adding the solids-not-fat to the fat reading.

Milk is a delicate substance and very susceptible to undesirable flavors and odors. These may be either of two types: (a) those which are absorbed from feed eaten by the cow or from outside sources, or (b) those resulting from the action of microorganisms, especially bacteria, in the milk itself. If it is exposed to strong odors, such as foul stable air, cabbage, gasoline, etc., they will be absorbed very quickly. If placed in an ice-chest with such foods as pineapple or strawberries, it will be quickly tainted and have a disagreeable flavor. Disagreeable as these absorbed troubles may sometimes be, they are not so serious as those resulting from the growth of bacteria. The former decrease after removal from the source of contamination, while those resulting from bacterial action continue to increase in intensity as the milk grows older. It is highly desirable that milk should reach the consumer in as nearly as possible, the condition in which it leaves the udder of the healthy cow. This means that much care must be exercised in its production and handling to prevent contamination. Bacteria gets into milk chiefly from the following sources: the interior of the cow's udder, the milk utensils, the surface of the cow's body, the atmosphere of the stable and milk house, and the hands and clothing of the milker. If the udder is free from disease, it is not a serious source of contamination, since its germ content rarely exceeds a few hundred per cubic centimetre. If, however, the udder is diseased, it may be a very serious source of infection. To secure milk with a low bacteria content those parts of the cow's body around the udder should be as clean as possible at milking time. The stable air should be free from dust, the milker's hands should be clean, and he should wear a clean suit. In many cases the utensils are the worst source of trouble, and great care should be taken to see that these are properly constructed and thoroughly washed and well sterilized either with boiling water or steam.

As soon as produced, milk should be cooled to a temperature which will prevent the rapid development of the bacteria in it. Bacteria grow very rapidly at temperatures above 70° F., but more and more slowly as the temperature is reduced below that point; at 50° or below, growth is relatively slow, hence for best results, milk should be held at these low temperatures. During recent years, the «pasteurization» of milk for the purpose of reducing the bacteria content and destroying any disease germs which may be present has become a common practice. Pasteurization consists of heating the milk to a temperature sufficient to kill all pathogenic organisms and a large percentage of the other forms, and then immediate cooling to prevent the rapid growth of those that remain. A temperature of 145° F. maintained for 30 minutes is believed to be sufficient to destroy all disease organisms.

The average per capita consumption of milk is about one-half pint per day. Large quantities, therefore, are required to supply the needs of the large cities, New York city alone consuming about 2,000,000 quarts daily. The problem of getting this vast amount of milk to the consumer in the city is a serious one for, as the cities have increased in size, it has been necessary to go farther away for the necessary supply of milk. At present, New York city obtains part of its milk supply from farms 300 to 400 miles away, which means railroad transportation of 10 to 12 hours, after which it must be taken to the city plant, pasteurized, cooled and bottled before ready for delivery. As a result this milk is frequently 24 to 36 hours old when delivered to the consumer. Because of the great rapidity with which bacteria grow, the injection of this long period of time between production and consumption has greatly increased the problem of a satisfactory city milk supply and has changed many of the methods of production and handling on the farm, during transportation and in the city.

Grades or Classes of Milk.— The present tendency is toward the division of milk and cream into grades, primarily upon its sanitary quality. The grades established in New York city will illustrate the general divisions into which market milk is placed: (1) Grade «A» — For infants and children. Raw: Cows tuberculin tested and free from all diseases; bacteria not more than 30,000 for milk and 150,000 for cream when delivered to the consumer or at any time prior to such delivery; employees free from all communicable diseases or disease germs; delivered to consumer within 36 hours after production. Pasteurized: Cows healthy, as determined by physical examination at least once each year; bacteria content not to exceed 200,000 before pasteurization and not more than 30,000 for milk and 150,000 for cream when delivered to consumer or at any time after pasteurization; employees free from communicable disease or disease germs; delivered to consumer within 36 hours after pasteurization; (2) Grade «B» — For adults (pasteurized). Cows in good health as determined by physical examination at least once each year; must not contain more than 1,500,000 bacteria before pasteurization and not more than 100,000 for milk and 500,000 for cream when delivered to consumer or at any time after pasteurization; employees free from communicable disease or disease germs; milk delivered to consumer within 48 hours after pasteurization, and cream within 72 hours; (3) Grade «C»— For cooking and manufacturing purposes. Milk or cream not conforming to all the requirements of the subdivisions of Grade A or Grade B, and which has been pasteurized, according to the regulations of the Board of Health, or boiled for at least two minutes. This milk must come from healthy cows, as determined by physical examination at least once each year; bacteria content must not be excessive; milk delivered to consumers in cans only, within 48 hours and cream within 72 hours after pasteurization. Same requirements as to health of employees as for Grades A and B. In addition to these requirements certain other regulations must be observed for each grade. In the case of each of these grades, the container must bear a distinct label, approved by the Board of Health, indicating the grade and no other statement or designating mark.

Certified milk is milk produced under the supervision and in conformity with the requirements of a medical milk commission appointed by the local county medical society. This milk must conform with very rigid regulations laid down by the commission, which insures this grade of milk being of a very high standard of composition and sanitary excellence.

Butter.— Butter is the fat of milk which has been separated from most of the other constituents by the process of churning. In modern dairy practice the cream is removed from the milk by centrifugal force, by means of the cream separator, this being possible because of the fact that the fat globules are lighter than the other constituents of the milk and are thrown out as the milk passes through the rapidly revolving bowl of the separator.

Bulletin 149 of the United States Department of Agriculture gives the following composition for butter:

AVERAGE COMPOSITION OF BUTTER BY CLASSES

CLASS	Number of samples	Fat	Water	Salt	Curd
		Per ct.	*Per ct.*	*Per ct.*	*Per ct.*
1 84 per cent fat or over	124	84.78	12.45	1.78	0.98
2 Less than 81 per cent fat	130	79.77	15.32	3.52	1.37
3 81 to 84 per cent fat	370	82.55	13.85	2.41	1.18
Variation	......	5.01	2.87	1.74	.39
Average of all samples	695	82.41	13.90	2.51	1.18

Variations in the composition of individual lots of butter are frequently much greater than those indicated by these averages. This is shown by the following:

RESULTS OF ANALYSES OF 117 SAMPLES FROM WISCONSIN

PERCENTAGE	Fat	Water	Salt	Curd
	Per cent	*Per cent*	*Per cent*	*Per cent*
Average............	82.48	13.77	2.61	1.14
Highest............	86.75	18.23	5.46	2.12
Lowest............	75.68	10.52	.95	.23
Variations......	11.07	7.71	4.51	1.89

There are two common types of butter, known as sweet cream and sour cream butter. The sweet cream butter is made from cream in which lactic acid has not been allowed to develop. It has a mild flavor which is desired by many persons, and may be made from either raw or pasteurized cream. Sour cream butter is made from cream in which lactic acid has been allowed to develop, resulting in a product with a more highly pronounced flavor. This is the standard type of butter in America and in most countries of Europe. The production of good butter of uniform quality and high flavor requires the use of cream which has been produced and handled with care, cleanliness being a first essential in the making of good butter. After the clean, sweet cream is obtained, the next step is the development of the proper degree of acid or the «ripening» process. This is brought about by the action of certain forms of bacteria commonly known as the lactic acid bacteria (*Bact. lactis acidi*), which work on the milk-sugar, changing it into lactic acid. It is during this ripening process that the characteristic flavors and odors of the butter are developed, the final flavor depending upon the kinds of bacteria which take part in the ripening and the degree to which the fermentation is allowed to develop. The finest qualities of the butter may be lost by the over-ripening of the cream. Cream may be ripened by the action of the lactic acid bacteria normally occurring in it or the process may be hastened by the use of a «starter,» which is a pure culture of the lactic bacteria grown in skimmilk or buttermilk. In many factories the cream is pasteurized before the starter is added, thus destroying most of the miscellaneous bacteria in the cream and making it possible to more completely control the nature of the ripening process. The purpose of churning is to remove the butter-fat from the milk serum and bring the fat globules into compact form. This is done by placing the cream in a churn of such form that when it is revolved slowly the cream is thoroughly agitated, thus bringing the minute fat globules in contact with each other and causing them to adhere as a result of the concussion. The ease with which cream will churn is influenced by many factors, but chiefly by the richness of the cream, the temperature and the speed of the churn. When a sufficient number of fat globules have coalesced to form visible granules, the butter has «come.» The churning process may be controlled to give granules of any desired size. After the churning has been completed, the buttermilk is drawn off and the butter washed with cold water to insure the further removal of the buttermilk and to firm or harden the butter-fat, so it can be more easily handled. The wash water is then removed, the desired amount of salt added and the butter worked enough to give an even distribution and thorough incorporation of the salt. It is now ready to be packed in tubs or made into prints, depending upon the market to which it is to be sent. The butter markets recognize certain fairly definite grades known as extras, firsts, seconds and thirds.

DEFINITION OF GRADES.—*Extras* shall be a standard grade of average fancy quality in the season when offered under the various classifications. Ninety per cent shall conform to the following standard; the balance shall not grade below Firsts:

Flavor: Must be sweet, fresh and clean for the season when offered if creamery, or sweet, fresh and reasonably clean if renovated or ladles. *Body:* Must be firm and uniform. *Color:* Not higher than natural grass, nor lighter than light straw, but should not be streaked or mottled. *Salt:* Medium salted. *Package:* Sound, good, uniform and clean.

Firsts shall be a grade next below Extras and must be good butter for the season when made and offered, under the various classifications. Ninety per cent shall conform to the following standard; the balance shall not grade below Seconds:

Flavor: Must be reasonably sweet, reasonably clean and fresh if creamery or renovated, and reasonably sweet if ladles. *Body:* Must be firm and fairly uniform. *Color:* Reasonably uniform, neither very high nor very light. *Salt:* May be reasonably high, light or medium. *Package:* Sound, good, uniform and clean.

Seconds shall be a grade next below Firsts. *Flavor:* Must be reasonably good. *Body:* If creamery, must be solid boring. If ladles or renovated, must be 90 per cent solid boring. *Color:* Fairly uniform, but may be mottled. *Salt:* May be high, medium or light. *Package:* Good and uniform.

Thirds shall be a grade below Seconds and may consist of promiscuous lots.

Flavor: May be off flavored and strong on tops and sides. *Body:* Not required to draw a full trier. *Color:* May be irregular or mottled. *Salt:* High, light or irregular. *Package:* Any kind of package mentioned at time of sale.

In grading any given lot of butter, it is scored on the basis of the following numerical values:

BUTTER SCORE CARD

	Perfect score	Score allowed
Flavor............................	45	....
Body............................	25	....
Color............................	15	....
Salt............................	10	....
Package............................	5	....
Total............................	100	....

Process or renovated butter is made from butter of very poor quality by subjecting it to certain methods of cleaning and clarifying. The butter-fat is melted and cleaned by washing, aerating and other processes. This clarified butter fat has very little taste or odor and must be reconstituted to make it resemble genuine butter. For this purpose it may be mixed with milk, skimmilk, buttermilk or cream and rechurned and worked to get the desired texture and flavor. In 1916 there were 23 factories operating under Federal licenses. These plants produced 27,542,015 pounds of renovated butter during the year, of which 635,038 pounds were exported.

Cheese.— Cheese is a product made from milk by the coagulation of the casein and the expulsion of a portion of the moisture. The finished cheese contains most of the milk-fat, the casein and a part of the milk-sugar and salts. In the process of making, a small per cent of the fat, most of the albumin and milk-sugar and a small part of the mineral matter are washed out with the larger part of the original water, in the form of whey. The chief purpose of making cheese is to bring the nutrients of the milk into a concentrated form so they will keep longer and develop the special flavors characteristic of the different types of cheeses. A great variety of cheeses are found on the markets of this country and Europe, the variety being much greater in Europe than here, although the number is increasing here. The Department of Agriculture gives a list of more than 100 kinds of cheese, with the methods of making and chemical composition of each. Cheeses may be divided into two general groups, based on the method used for coagulating the casein, these are the «acid-curd» cheeses and the «rennet-curd» cheeses. In the first group the casein is coagulated by the formation of lactic acid in the milk. This may result from the growth of the lactic acid bacteria normal to the milk or by the addition of a «starter.» The cheeses in this group are little more than fresh, sour curd and are eaten fresh without any ripening process. There are but few varieties. In the second group the coagulation is caused by the action of rennet, which is added to the milk while it is fresh and has but little acid. This group contains the varieties which are of greatest commercial value. At one end of this group are the so-called «hard,» while at the other end are the «soft» varieties. Between these extremes there are many kinds which blend into each other by imperceptible degrees, the chief differences being due to the degree of moisture they contain and the nature of the micro-organisms causing the ripening processes. The most important of the cheeses is the one known as the American or Cheddar cheese. Its composition depends upon the quality of the milk and the method of making. Extended studies by the New York Experiment Station show the following composition for Cheddar cheese made from normal milk:

	Lowest	Highest	Average
Water	32.69	43.89	36.84
Total solids	56.11	67.31	63.16
Fat	30.00	36.79	33.83
Proteins	20.80	26.11	23.72
Salts, etc. (represented in ash)	3.12	7.02	5.61
Percentage of solids in form of fat	50.39	56.83	53.56
Ratio of fat to proteins	1:0.79	1:0.63	1:0.70

The differences in composition are due chiefly to the variations in fat and casein in the milk.

The yield of cheese from milk is directly influenced by the per cent of fat it contains. This is shown by the following table:

RATIO OF FAT TO CHEESE YIELD IN NORMAL MILK (VAN SLYKE)

Per cent of fat in milk	Per cent of casein in milk	Pounds of cheese made from 100 lbs. of milk	Pounds of cheese made for each lb. of fat in milk
3.00	2.10	8.30	2.77
3.25	2.20	8.88	2.73
3.50	2.30	9.45	2.70
3.75	2.40	10.03	2.67
4.00	2.50	10.60	2.65
4.25	2.60	11.17	2.63
4.50	2.70	11.74	2.61
4.75	2.80	12.31	2.59
5.00	2.90	12.90	2.58

It will be seen that the yield of cheese increases with the per cent of fat in the milk, the increase, however, being not directly proportional to the increase in fat because the casein does not increase as rapidly as the fat. The quality of the cheese which can be made from any given lot of milk depends very largely upon the care it has received. Clean milk is the first essential for successful cheese making, and great care should be used not to take in milk having high acidity or bad flavors or odors or showing visible dirt. Any of these conditions indicate the presence of certain types of bacteria which will injure the quality of the finished product. After milk of good quality has been obtained, the first step is to develop the proper degree of acidity. This may be done by allowing the milk to stand at a temperature favorable to the growth of the lactic acid bacteria, or the process may be hastened by using an artificial starter, as in the making of butter. As soon as the desired degree of acidity has developed, the rennet should be added. The amount to be used, as given by Publow, depends on (1) the strength of the extract; (2) the temperature of the milk; (3) the acidity of the milk; (4) the composition of the milk; (5) the kind of cheese to be made, and (6) the temperature of curing. In general, an amount sufficient to coagulate the milk fit for cutting in 25 to 35 minutes should be used; generally from 2½ to 4 ounces for 1,000 pounds of milk will suffice.

When the milk is well coagulated, small wire knives designed for the purpose are used to cut it into small cubes to allow the whey to escape. It is important that the expulsion of the whey and the firming of the curd should be carefully controlled, which is done by stirring the curd and by the application of heat. When the little cubes of curd have contracted to slightly less than one-half their original size and are firm and rubber-like, the whey is drawn off from the vat. As soon as the whey is sufficiently removed the curd is piled along either side of the vat and allowed to drain thoroughly; after it is well matted it is cut into strips which may be piled to any desired depth to hasten the further removal of the whey. This cheddaring process is continued till the curd shows the desired texture and the whey coming from the curd has the required degree of acidity. The curd is now «milled» by running it through a machine which cuts it into small, even sized pieces in order to further assist in the escape of the whey and make the salting process easier. The curd is then spread over the bottom of the vat, the salt sprinkled over the surface and the curd is stirred to insure the even distribution of the salt to the surface of each piece. The chief purpose of the salt is to improve the flavor of the finished cheese; it may also assist in the removal of whey and the control of acid development. It is now ready to be put into proper form for marketing by placing the loose pieces of curd in metal hoops and subjecting to sufficient pressure to cause the pieces of curd to adhere to each other firmly. American Cheddar cheese is placed upon the market in a number of forms or styles as is indicated by the following table:*

Name	Shape	Approximate size In dia.	Approximate weight Lbs.
Cheddar or Export	Cylindrical..	14–15	60–70
Flats or twins....	"	14–15	30–35
Home-trade......	"	11–13	20–25
Daisies..........	"	12–13	20
Young America...	"	7–8	8–12
Longhorn........	"	5	12
Picnic...........	"	4–5	1–2
Square..........	Rectangular.	Various (3-4 in. thick)	
Print...........	"	10x10x2½	10 (marked in blocks or prints)

Cheese of the Cheddar type requires considerable time for the development of the characteristic flavor. When first made the texture is tough and rubbery, and there is little cheese flavor or aroma, but in the course of a few months chemical and biological changes take place which give the cheese a soft, smooth texture and its characteristic aroma and flavor. Not all the changes occurring during this ripening process are well understood, but it is known that they are largely the result of bacterial action and that the *Bact. lactis acidi* and *B. bulgaricus* types are important agents. This kind of cheese is commonly eaten at from three months to one year of age, depending upon the amount of flavor desired by the consumer. The following score card shows the method of judging the quality of this type of cheese:

CHEESE SCORE CARD

	Perfect score	Score allowed
Flavor..............................	50	......
Body and texture.....................	25	......
Color...............................	15	......
Finish..............................	10	......
Total............................	100	......

There are several groups of cheeses of distinct characteristics resulting from the nature of the micro-organisms which cause the ripening. One of these groups contains the Roquefort, Gorgonzola and Stilton in which a species of *Penicillium* mold plays a very important part in the ripening and development of the characteristic flavor. In these cheeses, the mold grows all through the interior and produces a rather strong, pungent flavor. Another type is represented by the *Camembert*, originating in France, but now made also in this country. This is a soft cheese in which the ripening is brought about by the combined action of molds and bacteria. A species of *Penicillum* grows upon the surface, producing enzymes which work into the curd, changing it to a soft creamy, semi-fluid texture. At the same time, *Oidium lactis* develops on the surface and this, together with the lactic bacteria growing inside the cheese, is largely responsible for the final flavor. Certain other species probably play a minor part in the ripening process. Still another group contains the Cottage, Cream, Neufchatel and others. These are soft cheeses which undergo no special type of ripening, but depend chiefly upon the amount of cream contained for their richness and flavor.

Ice Cream.— The manufacture and consumption of ice creams has increased rapidly in recent years. Formerly it was considered simply as a delicacy to be used only in hot weather, but now its real food value is recognized and it is an article of year round consumption. The term "ice cream," as at present used, includes a great variety of products, the chief characteristic of which is that they are eaten in a frozen condition. Most of these are made from milk or cream with the addition of sugar and some flavoring material, frequently a small amount of "filler" being used. These products vary widely in the per cent of butter-fat and the flavoring materials used. The classification for this class of dairy products given by the Iowa Experiment Station (Iowa Bulletin 123) is: Plain ice creams, nut ice creams, fruit ice creams, bisque ice creams, parfaits, mousses, puddings, aufaits, lactos, ices, including sherbets and punches.

The following score card for judging ice cream has been prepared by the Wisconsin Experiment Station: Flavor, 40; body and texture, 20; bacteria, 20; fat, 10; appearance and color, 5; package, 5.

Fermented Milk Drinks.—Within recent years several forms of milk drinks which have undergone a lactic acid fermentation have come to be extensively used for human consumption. These various forms of buttermilk are all rich in food nutrients since they are made from some form of milk, but they are chiefly valuable as an aid to digestion and in the treatment of certain forms of intestinal disorders. They are found on the market under a variety of trade names such as kefir, kumiss, bacillac, zoolak, matzoon, yogurt, leben, etc. All these products are the result of changes caused by the action of certain types of micro-organisms. In some of them, as in common buttermilk, the fermentation is caused by the action of the common lactic acid bacteria (*Bact. lactis acidi*) in splitting up the milk sugar and forming lactic acid. Normally from 0.6 to 0.8 per cent of acid is formed. This type of buttermilk may result as a by-product of the ordinary process of butter-making or it may be made artificially by inoculating milk with a "starter" of lactic acid bacteria. After the milk is coagulated, it is churned to give it a smooth creamy consistency, then held at a low temperature to prevent further bacterial growth or deterioration in flavor. Most of the commercial fermented milks are made with cultures of *Bacillus bulgaricus*, a type of lactic acid organism originally introduced from Bulgaria, but which has recently been found to be common in milk in this country. A culture of *B. bulgaricus* is added to either skimmed or partly skimmed milk from which the miscellaneous flora present in the raw milk has first been eliminated by pasteurization. In this way, a more uniform product of high quality can be secured. After standing at the proper temperature until coagulated, the milk is churned in order to secure the desired smooth, creamy texture and then bottled and kept cold until needed for use. The *B. bulgaricus* is capable of producing a much higher percentage of acidity than is *Bact. lactis acidi*, 2 to 3 per cent being not uncommon. It also gives a flavor which is preferred by many persons. Another type of product is represented by the kumiss and kefir in which there is an alcoholic as well as a lactic fermentation, the former being caused by the action of certain species of yeasts, which may develop 1 or more per cent of alcohol. Carbonic acid gas is also developed, causing these products to be decidedly effervescent.

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*'Science and Practice of Cheese-making.'

Condensed Milk.— Some of the difficult problems in handling market milk are due to the facts: first, that it is bulky and, therefore, expensive to handle and transport; second, under normal conditions its life is not more than two or three days; and, third, its production is not constant throughout the year, resulting in periods of shortage and surplus. To overcome these difficulties large amounts of milk are now being condensed. This method was first used in America by Gail Borden in 1856, his first plant being in Connecticut. At first the industry grew very slowly, but in recent years its development has been very rapid and it now represents one of the important branches of the dairy industry. In 1914 the output of condensed milk in the United States amounted to 875,507,438 pounds, with a money value of $58,870,609. In general there are two kinds of condensed milk, known as sweetened and unsweetened. The first is made by condensing about 2½ to 3 parts of milk to one part of finished product and the addition of about 40 per cent of cane sugar. In the second 2 to 2½ parts of milk are condensed to one part and no sugar is added. The removal of water is accomplished by heating the milk in partial vacuum, the milk usually being heated to 160° F. or higher in an open tank before being run into the vacuum pan. In the sweetened product the sugar is added to the milk in this open heating tank. The condensing is usually done under a pressure of about 25 inches and at a temperature of 130° to 160° F. This makes it possible to remove the water rapidly without imparting very much cooked flavor to the finished product. When it has reached the desired degree of concentration it is removed from the vacuum pan and run into suitable containers for marketing. That which is designed for household use is put into hermetically sealed tin cans, while for the wholesale trade milk cans or barrels may be used. While the sweetened condensed milk is not sterile it will keep for considerable lengths of time because of the inhibiting effect of the high concentration of the milk solids and the added cane sugar upon the growth of the few micro-organisms it contains. The unsweetened product is sterilized after the cans are sealed by treatment in a steam sterilizer, where it is subjected to pressure and a temperature well above the boiling point for from one to two hours. After being taken from the sterilizer the cans are placed in a mechanical device and shaken violently, for the purpose of breaking up any particles of curd which may have formed and to give the milk a smooth creamy consistency. Richmond gives the composition of the different kinds of condensed milk as follows:

COMPOSITION OF CONDENSED MILK

UNSWEETENED

SAMPLE	Water	Fat	Milk-sugar	Protein	Ash
1............	63.47	10.22	12.98	10.30	2.07
2............	62.40	11.91	13.04	9.68	2.14
3............	63.07	10.86	13.38	9.80	2.21

SWEETENED

(Made from whole milk)

SAMPLE	Water	Fat	Milk-sugar	Cane-sugar	Protein	Ash
1..........	24.06	11.28	13.97	38.31	9.36	2.13
2..........	26.10	10.84	14.68	36.93	9.55	1.90
3..........	25.69	10.98	16.29	32.37	12.33	2.34

(Made from skim-milk)

SAMPLE	Water	Fat	Milk-sugar	Cane-sugar	Protein	Ash
1..........	29.05	1.28	14.91	40.07	10.63	2.33
2..........	29.23	0.64	15.50	40.19	10.73	2.63
3..........	28.43	0.36	16.88	39.27	11.73	2.58

Considerable quantities of both the sweetened and unsweetened condensed milk are used for household purposes, especially in hot climates where fresh milk cannot be easily secured. Large amounts are used in the army and navy and for ocean voyages. That which is put up in bulk is used for manufacturing purposes, chiefly by bakers, candy and ice cream makers.

Powdered Milk.— Powdered milk is made by the more complete removal of moisture than in the case of condensed milk. The objects sought by this process are similar to those for which condensed milk is made; namely, reduction in volume and cost of transportation and an increase in keeping quality. Two distinctly different methods are in use for making powdered milk. In one the partly condensed milk is dried on the surface of a heated revolving drum, and in the other it is sprayed or atomized into a current of heated air. In the former method the dried milk is scraped from the surface of the drum by means of knives, then ground into flour. In the latter method the moisture escapes as the minute particles of milk fall through the hot air, and the finished product collects on the floor of the drying chamber in the form of a very fine powder. Powdered milk is made from milk with different percentages of fat and also from skim-milk.

Powdered milk is not entirely sterile, but since it normally contains not more than 3 to 5 per cent of moisture bacteria cannot grow in it. If properly protected against moisture it will keep for a long time. Its chief uses are for cooking and for the making of candies and ice cream, for which purpose its small bulk and excellent keeping quality make it especially valuable. By the reincorporation of the proper amount of water powdered milk may be made to resemble normal fresh milk.

Malted Milk.— Is made from whole milk and the liquid obtained from a mash of ground barley, malt and wheat flour. Small amounts of sodium chloride, sodium bicarbonate or potassium bicarbonate may be added. This product is then dried until it contains not more than 3½ per cent of moisture. Its keeping properties are similar to those of powdered milk. Malted milk is largely used in the artificial feeding of infants. See FARM MANAGEMENT.

WILLIAM A. STOCKING,
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DAIS, dā'is, a platform or raised floor at the upper end of an ancient dining hall, where the high table stood; also a seat with a high wainscot back, and sometimes with a canopy, for those who sat at the high table. The word is also sometimes applied to the high table itself.

DAISY (from «day's eye», in allusion to the appearance of the flower), a name applied to many plants of the Aster family, especially to those in which the heads are surrounded by white rays. The daisy proper is *Bellis perennis*, native of Europe, often grown, in its double forms, for its handsome flowers. In America the name daisy is most often applied to *Chrysanthemum leucanthemum*, known also as ox-eye daisy, a native of Europe but naturalized as a weed in eastern North America. The wild asters are sometimes known as daisies and various species of *Erigeron* are known by the same name.

DAISY MILLER. To know this novel by Henry James in all its forms, from the straightforward first telling of the story in the *Cornhill Magazine* in 1878 to its revision in the New York edition of 1909, including the preface to the latter and the reworking of the former as a comedy (printed in the *Atlantic Monthly* in 1883), is to know the matter and the manner of its author as well as any one book or group of books can indicate the changing style and spirit of an author. Although refused by the first publisher to whom it was offered, as «an outrage on American girlhood,» 'Daisy Miller' justified itself by its later success both in England and America. It was, Mr. James says, «promptly pirated in Boston — a sweet tribute I hadn't yet received and was never again to know — and became ultimately the most prosperous child of my invention.» Although essentially dramatic in its quality as a story, it lost its character when rewritten as a play, and 'Daisy Miller: A Comedy' was the first of a line of paradoxical failures which marked the playwritings of this dramatic storyteller. As a character, too, Daisy Miller was one of the first of a long line — the successful line of those «international young ladies» who represent over a third of the feminine interest in Mr. James' stories. Like Charlotte Verver and Maggie, Julia Bride, Isabel Archer, Miss Gunton, Pandora Day, and dozens of others, she was young America sketched on a background of Europe, where neither the glare of her moneybags nor the shadow of her newness could obscure her real inwardness. Whether she was altogether fine like Isabel Archer in 'The Portrait of a Lady,' exquisitely, unmorally superior like Charlotte Verver in 'The Golden Bowl,' or naïvely, tragically vulgar, made up of «charming little parts that did not match and that made no ensemble,» like Daisy Miller, she was always a type that Henry James drew with vigor, truth and affection. For anyone interested in the contrast between the «early» and the «later» manner of James, a parallel reading of the first and last editions of 'Daisy Miller' will well repay study. Artistically, the simpler diction and form of the original is as much better suited to the tale as it would be less well suited to the more intricate psychology of 'The Awkward Age,' 'The Ambassador,' or 'The Golden Bowl.'

EDITH J. R. ISAACS.

DAK, dâk, or **DAWK**, a Hindu word used in India for the mail or post; a relay of men, as for carrying letters, dispatches, etc., or travelers in palanquins. The route is divided into stages and each bearer or set of bearers serves only for a single stage. A dak-bungalow is a house at the end of the stage designed for those who journey by palanquin.

DAKAR, dä-kär', Senegal, a port furnishing one of the best harbors on the west coast of Africa. It is situated near Cape Verde. There is a railroad between the port and the capital, Saint Louis. Dakar is a fortified military post. Pop. about 25,000.

DAKOTA, or **DAKOTAH**, a tribe of North American Indians, constituting at one time an important element in the great Sioux group. They were reported numerous in the 17th and 18th centuries and roamed over extensive hunting grounds in parts of the present States of North Dakota and South Dakota. The tribe consisted of six sub-tribes: (1) Santee; (2) Sisseton; (3) Yankton; (4) Wahpeton; (5) Yanktonnai; (6) Teton. These subtribes were divided into bands or groups; as, the Tetons consisted of the Brulé, Blackfeet and other groups. The Dakotas were fond of war and when not fighting against outsiders would sometimes fight among themselves. In 1658 they had 30 towns on the Mississippi, the Missouri and Saint Croix. The old war spirit has not died out; in 1862 a portion of the tribe attacked the whites and killed about 1,200. In 1890–91 the whites feared another uprising when the ghost-dance took place at the Pine Ridge agency. The Dakotas are located in the United States, chiefly in North and South Dakota, Nebraska and Montana. There are about 900 in Canada and in the United States about 25,623. See INDIAN SCHOOLS; RESERVATIONS, INDIAN; SIOUAN.

DAKOTA. States of the United States. See NORTH DAKOTA; SOUTH DAKOTA.

DAKOTA RIVER. See JAMES RIVER.

DAKOTA STAGE, one of the formations of the Lower Cretaceous series in the United States. The rocks, mostly conglomerates, clays and sandstones, cover a vast area extending over the Great Plains from Texas northward into Canada. Their origin is still a matter of speculation, since they are not marine; and in Texas lie unconformably upon the Comanche limestone. Near the Rocky Mountains the Dakota beds are much tilted, hardened and eroded. West of the Rocky Mountain uplift the Dakota rocks are more fine-grained and include beds of coal or lignite of workable thickness. In much of the Rocky Mountain region the Dakota rests conformably upon Comanchean and even Jurassic strata. The exact equivalent of the Dakota stage along the eastern border of the United States is undetermined. The lower cross timber sand of Georgia and Mississippi is probably equivalent to the Dakota. See CRETACEOUS SYSTEM.

DAKOTA WESLEYAN UNIVERSITY. A charter for an institution to be known as Dakota University was obtained in 1883, as the result of a resolution of the Dakota Mission Conference held at Parker the year before. This resolution had provided for the appointment of a committee to investigate various offers of land and money for the object of establishing a school under the auspices of the Mission Conference. During the years 1883 and 1884 a stock company was formed, university addition to the city of Mitchell was plated, lots were sold, and in this way and by subscriptions, money was raised to begin the construction of a college building. In April 1885 a new company was organized and a new charter obtained which provided for the "establishment of an institution of learning of high grade at Mitchell, S. Dak., whose course of instruction should become and be a full university course." Provision was made also for the establishment of a preparatory department and of "such auxiliaries and branches as shall be decreed by the board of directors, in localities where suitable aid shall be offered for that purpose." The university and all of its departments were to be under the control of the Methodist Episcopal Church. The university was opened and instruction was begun in the fall of 1885. In 1886 the Dakota Conference at its session at Watertown formally accepted the new institution, and since that time it has been under the control of a board of directors elected by the Conference. On 9 March 1888 the college building was completely destroyed by fire. Other quarters were, however, provided for the classes and the work continued without serious interruption. During the following year a new building was erected, the present College Hall. More recently Graham Hall, the President's House and Science Hall have been added. These buildings are all constructed of Sioux Falls granite. They are modern and well adapted to their purposes. Since the construction of Science Hall the laboratories have been quite generously equipped. The total resources of the institution besides campus, buildings and equipment are approximately $300,000. The library contains 40,000 volumes and the total enrollment is 400. The attendance for the last school year is 369.

DAKSHA, dăk'shă, in Hindu mythology, a priest to whom Siva, his son-in-law, gave a ram's head after he had cut off Daksha's head in anger, because he did not invite the god to his grand sacrifice.

DAL, däl, **Vladimir Ivanovitch**, Russian lexicographer: b. Lugansk, govt. Ekaterinoslav, 1801; d. Moscow, 3 Nov. 1872. Of Danish parentage, he studied medicine at Dorpat (now Yuriev), and as military doctor took part in the Turkish and Polish campaigns of 1828–31. He was attached to the governor-general's staff in Orenburg for some years, and later accompanied the expedition to Khiva in 1839. Liberated from official duties, Dal made a tour of observation and research throughout the Russian Empire, collecting ethnographical data, folklore and some 30,000 proverbs, sayings and idioms. These he published between 1862 and 1879. His most valuable work was an 'Explanatory Dictionary of the Living Russian Languages' (in 4 vols., Moscow 1861–68). His stories vividly reflect the characteristics of the people. A collected edition of his works was issued in Saint Petersburgh in 1860–61. His 'Handbook of Botany' appeared in 1849.

DAL, a Swedish word signifying, like the German *Thal*, valley, as in Dalecarlia.

DALAGUETE, dä-lä-gā'tā, Philippines, a town on the southeast coast of Cebú, 44 miles southwest of the town of Cebú. It was founded in 1711. Pop. 21,825.

DALBERG, däl'bĕrg, **Karl Theodor**, BARON VON, Prince and Archbishop of Mayence, chancellor of the empire, and elector: b. 1744; d. Ratisbon, 10 Feb. 1817. Having made his academic studies in the universities of Göttingen and Heidelberg, he devoted himself to the study of canon law and entered the ecclesiastical state. In 1772 he was made, by the Elector-Archbishop of Mayence, privy counselor and governor of Erfurt. His administration was directed purely to the welfare of the people and he earned the reputation of being a faithful and capable man of affairs. He continued in the service of the elector and at the death of his patron he succeeded him as archbishop, elector and arch-chancellor of the empire (1802). In 1804 the Pope, Pius VII, being then in Paris for the occasion of the crowning of Napoleon, Archbishop Dalberg was invited by Napoleon to Paris for the purpose of inducing Pope Pius to approve a proposed readjustment of ecclesiastical affairs in Germany. The archbishop served well the interests of the French emperor and later had his reward when the readjustment was effected, for, though he had to give up the archiepiscopal see of Mayence and his dignities in the empire, he was more than recompensed by being made metropolitan of Ratisbon, while Aschaffenburg, Wetzlar and Ratisbon were erected, on his behalf, into a princedom. Further his purely ecclesiastical jurisdiction was enlarged by being made to extend over such parts of the ecclesiastical jurisdiction of Mayence, Cologne and Treves as lie on the right bank of the Rhine. But of all these dignities and powers, except the archbishopric of Ratisbon, he was deprived after the fall of Napoleon. He was a man of learning, a lover and patron of art and the intimate friend of Goethe, Schiller, Wieland and the great contemporary lights of German literature. He was author of several works on philosophy and æsthetics (much consulted by scholars), and he took a lively interest in natural history, mineralogy, chemistry and agriculture. Consult Beaulieu-Marconnay, 'Karl von Dahlberg und seine Zeit' (2 vols., 1879); and Krämer, 'Life of Karl von Dahlberg' (Leipzig 1821).

DALBERGIA, a genus of fine tropical forest trees and climbing shrubs, natural order *Leguminosæ*, some species of which yield excellent timber. *D. latifolia* (the blackwood, or East Indian rosewood) is a magnificent tree, furnishing one of the most valuable furniture woods. *D. sissoo* gives a hard, durable wood, called sissoo, much employed in India for railroad sleepers, house- and ship-building, etc. Similar forms are found in Brazil.

DALCHO, Frederick, American physician: b. London, England, 1770; d. Charleston, S. C., 24 Nov. 1836. His father, a distinguished officer under Frederick the Great, had retired to England for his health, and at his death Frederick came to Baltimore, Md., at the invitation of his uncle, who had removed to that place a few years before. Here he received a classical education, and then studied medicine, giving special attention to botany. He then entered the medical department of the army, and was stationed at Fort Johnson, Charleston harbor, but, in consequence of some difficulty with his brother officers, resigned in 1779, and practised in Charleston, where he was active in establishing a botanical garden. About 1807 he left his practice and became one of the editors of the Charleston *Courier*, a daily Federal newspaper. He began to be interested in theological studies in 1811, and in 1818 was ordained a priest of the Protestant Episcopal Church. In 1819 he became assistant at Saint Michael's, Charleston, where he remained until his death. He published 'Evidence of the Divinity of Our Saviour' (Charleston 1820); 'Historical Account of the Protestant Episcopal Church in South Carolina' (1820); and 'Ahiman Rezon' (1822).

DALCROZE, dal'krōz', **Emile Jacques**, Swiss composer and originator of eurythmics: b. Vienna, 6 July 1865. He lived in Geneva from 1873 to 1910. While pursuing the study of literature at the University of Geneva, he also attended the conservatory. Later he studied with Fuchs, Graedener and Bruckner at the Vienna Conservatory, and also with Delibes in Paris. In 1892 he became professor of harmony and solfeggio at the Conservatory of Geneva. It was here that he first conceived his idea of laying special stress on rhythm. He began by insisting on his pupils beating the time with their hands. Gradually the feet and the entire body were called into play, thus co-ordinating the music with elaborate and graceful rhythmic movement. He had developed his ideas to a considerable extent when he succeeded in interesting the French psychologist Edouard Claparide, and together with him he elaborated a special terminology and reduced his practice to a system. When his request to have his system introduced as a regular course into the conservatory was refused, he resigned and left Geneva. At Helleran, near Dresden, he established in 1910 a special school for eurythmics, of which he was thereafter the director. The fame of this institution spread rapidly, so that within three years the system found its way into many schools of Germany, France, Russia and England. In 1913 it was introduced into Bryn Mawr College, and two special schools were established in New York and Chicago respectively. He has written two operas, 'Janie' (1893) and 'Sancho Panza' (1897); 'La Veillée' and 'Poème Alpestre,' for soli, chorus and orchestra; a violin concerto and some excellent songs.

DALE, Alan (ALFRED J. COHEN), American dramatic critic: b. Birmingham, England, 14 May 1861. After leaving Oxford University he came to the United States and was dramatic critic on the New York *Evening World* 1887–95, and on the New York *Journal* from 1895, and later on the New York *American*. He has published 'Jonathan's Home'; 'A Marriage Below Zero'; 'An Eerie He and She'; 'My Footlight Husband'; 'A Moral Busybody'; 'An Old Maid Kindled'; 'Familiar Chats with Queens of the Stage'; 'Conscience on Ice'; 'His Own Image'; 'A Girl Who Wrote' (1902); 'Wanted — A Cook'; 'The Great Wet Way' (1909).

DALE, David, Scottish manufacturer: b. Stewarton, Ayrshire, 6 Jan. 1739; d. Glasgow, 17 March 1806. He commenced life as a weaver, and having made the acquaintance of Sir Richard Arkwright a partnership was entered into between them for the erection of cotton-mills on the Clyde, and the settlement of New Lanark was in consequence formed. He had also extensive shares in other spinning factories established under his superintendence in various parts of Scotland, and was head partner in a large manufacturing firm in Glasgow, besides acting there as agent for the Royal Bank of Scotland. In 1799 he retired from business, and disposed of the works at New Lanark to a company of English capitalists, who entrusted the management of them to the celebrated Robert Owen (q.v.), who afterward married Mr. Dale's eldest daughter. He was the founder and pastor of a small religious sect called «Dalites,» or «Old Independents.»

DALE, Richard, American naval officer: b. 1756; d. 1826. At the beginning of the Revolutionary War he joined the English service, but soon resigned and entered the American navy, serving under John Barry and later as first lieutenant to Paul Jones. He distinguished himself in the engagement between the *Bon Homme Richard* and the *Serapis*. He was several times a prisoner. He became captain after the war, and in 1801 commanded a squadron sent against Tripoli. He resigned the following year and the remainder of his life was spent in retirement.

DALE, Robert William, English Congregational clerygman: b. London, 1 Dec. 1829; d. 13 March 1895. He was for many years one of the foremost of non-conformist leaders in England. In 1868–69 he was chairman of the Congregational Union and for seven years was editor of *The Congregationalist*. In 1877 delivered a series of lectures on preaching at Yale University, being the first Englishman appointed to the Lyman Beecher lectureship. Among his more important writings are 'The Atonement' (1875); 'Lectures on Preaching' (1877); 'The Epistle to the Ephesians: its Doctrine and Ethics' (1882); 'The Living Christ and the Five Gospels' (1890); 'Fellowship of Christ' (1891). He was a versatile and powerful speaker and exercised an extended influence, both in the United States and England.

DALE, SIR Thomas, Colonial governor of Virginia: d. Masulipatam, India, 1619. The date of his birth is unknown. He served with the English troops in the Netherlands and in 1606 was knighted by James I. The London Company sent him to Virginia in 1611 with supplies. In the absence of the governor-general, Lord de la Warr, Dale acted as deputy governor from May to August 1611, when he was succeeded by Sir Thomas Gates, but he was in control again in 1614–16. His administration was noted for its severity. He placed the colony under martial law and republished a code of severe repressive laws, since known as «Dale's Code.» He defeated the Indians and founded the settlements of Henrico and Bermuda Hundred. He returned to England in

1616, was sent with an East India Company fleet against the Dutch in 1618 and defeated a Dutch fleet near the present Batavia in November 1618. Consult Brown, ‘The Genesis of the United States’ (Boston 1890); id., ‘The First Republic in America’ (ib. 1898); Bruce, ‘Economic History of Virginia’ (New York 1907). The laws above referred to may be found in Force, ‘Tracts and Other Papers Relating to the Colonies in America’ (Vol. III, Washington 1836–46).

DALE, Thomas Nelson, American geologist: b. New York, 25 Nov. 1845. In 1885 he joined the United States Geological Survey, of which he became geologist in 1892. From 1893 to 1901 he was instructor in geology and botany at Williams College. He is author of ‘The Scientific Spirit Applied to Living Subjects’ (1913); also various bulletins, reports and papers on geological subjects.

D'ALEMBERT, da'län'bär', the assumed name of Jean le Rond, French mathematician and philosopher: b. 1717; d. 1783. He was the natural son of Chevalier Destouches and Madame de Tencin. As an infant he was left on the portico of the chapel of Saint Jean le Rond. His father contributed secretly toward his support and had him educated by the Jansenists at the Collège Mazarin, where he was especially brilliant in mathematics, physics and astronomy. At the age of 22 he published a work on the integral calculus and two years later a work on the refraction of solid bodies. His ‘Dynamics’ (1743) is an epoch in mechanical philosophy. In it is elaborated his famous principle, “The impressed forces are equivalent to the effective force.” He was elected to the Academy of Sciences in 1741 and to the French Academy in 1754, becoming the perpetual secretary of the latter in 1772. From 1751 to 1758 he was associated with Diderot in editing the ‘Encyclopédie.’ To it he contributed the general introduction, sketching in broad outline the evolution of civilization, art and science. He was invited by Frederick II to become president of the Berlin Academy, and by Catharine II of Russia he was offered 100,000 francs a year as tutor to her son. Because of his desire to live simply, he refused both offers. In his last years he was closely associated with Mlle. de l'Espinasse, and her death in 1776 was a shock from which he never recovered. D'Alembert ranks among the greatest geometricians of his century, and holds a high place also in literature and philosophy. His great service to letters was his exposure of the evils of patronage and his fostering the independence of his class from social and political power. Consult Bertrand, ‘D'Alembert’ (Paris 1889); Condorcet, ‘Eloge de D'Alembert’ (delivered before the Academy, 1784); Tallentyre, “D'Alembert the Thinker,” in his ‘Friends of Voltaire’ (London 1906). There is a partial edition of D'Alembert's ‘Works’ by Bossange (Paris 1821).

DALÉN, (Nils) Gustaf, Swedish engineer: b. Stenstorp 1869. He was educated at the Gothenburg Engineering Institute and the Zurich Polytechnicum. An eminent consulting engineer, he was employed by the Swedish Carbide and Acetone Company in 1905, and later by the Swedish Gas-Accumulator Company. He invented a method for dissolving acetylene in acetone which is used for automatic lighting in unmanned lighthouses and for railway signals; and he improved hot-air turbines, air compressors and milking machines. In 1912 he received the Nobel prize in physics and in 1913 was elected to the Royal Swedish Academy of Science. He wrote technical papers and a book, ‘Chemische Technologie des Papiers’ (1911).

DALHOUSIE, George Ramsay, 9th Earl of, English soldier and administrator: b. 1770; d. 1838. He saw service at Martinique, in the Irish Rebellion of 1798, in Egypt and in the Peninsular War, and was present at the battle of Waterloo. In 1815 he was raised to a peerage of the United Kingdom as Baron Ramsay. He was lieutenant-governor of Nova Scotia, 1816–20, and founded Dalhousie College (q.v.), Halifax. His term as governor-in-chief of Canada, 1820–28, was marked by conflicts with Papineau and the Lower Canada assembly. He was instrumental in founding the Quebec Literary and Historical Society, and in raising a monument to the joint memories of Montcalm and Wolfe.

DALHOUSIE, James Andrew Ramsay, 10th Earl and 1st Marquis of, British statesman: b. near Edinburgh, 22 April 1812; d. 19 Dec. 1860. After filling the offices of vice-president (1843) and president of the board of trade (1844), he was appointed governor-general of India (1847). In the administration of Indian affairs he showed marked ability, establishing railway lines, telegraphs, irrigation works, etc. Under his rule was annexed the Punjab, Oude, Berar and other native states, as well as Pegu in Burma, to the British Empire. His policy of annexation — especially where it was brought about through the failure of natural heirs in native states adjoining the British dominion, has been severely criticized; but that aside, he is regarded as one of the greatest of the Indian proconsuls. He was created a marquis in 1849.

DALHOUSIE, New Brunswick, capital of Restigouche County, and a port of entry. It is situated on Chaleurs Bay and the estuary of Restigouche River. The chief industries are fishing and trading in lumber, salmon and lobsters. Pop. 1,650.

DALHOUSIE COLLEGE AND UNIVERSITY, an institution of learning located at Halifax, N. S. It was founded in 1818 by the Rt. Hon. George Ramsay (q.v.), 9th earl of Dalhousie, whose last public act in Nova Scotia was the laying of the cornerstone of the old building, 22 May 1820, but it was not until 13 Jan. 1821 that the “bill to incorporate the Governors of Dalhousie College at Halifax” became a law. The purpose of the college as originally stated was “for the education of youth in the higher branches of science and literature,” and “to be open to all occupations and sects of religion.” It was to be modeled after Edinburgh University. The first name of Dalhousie was the “College of Halifax,” but in 1821 the legislature granted £1,000 to the new college and named it after its founder. The original endowment, about £10,000 ($50,000), was derived from funds collected at the port of Castine, Me., during its occupation in 1814 by Sir John Sherbrooke, then lieutenant-governor of Nova Scotia. In 1841 university powers were granted to the college. The early history of Dalhousie is a brave struggle for existence. Two attempts were made to unite it with King's College (q.v.), but both proved failures. It did not open its doors until 1838, and closed them again in 1843. From 1844 to 1863 Dalhousie ceased to operate as a college, and the governors either allowed the funds to accumulate or managed it as a high school. In 1863 the college was reorganized, with a staff of six professors, a tutor in modern languages and about 60 students. The governing bodies of the institution are (1) the board of governors, the supreme governing body; appointments to it are made by the governor-in-council on the nomination of the board. The governors have the management of the funds and the property of the college; the power of appointing the president, professors and other officers and of determining their duties and salaries, and the general oversight of the work of the university. (2) The senate, consisting of the presidents and professors. To this body are entrusted, by statute, the internal regulations of the university, subject to the approval of the governors. All degrees are conferred by the senate. (3) The faculties of arts and science, law, medicine and dentistry. These are committees of the senate for the supervision of the teaching of the university, the preparation of regulations governing the courses of study and the recommendation of suitable candidates for prizes, scholarship, diplomas and degrees. In addition to the courses in the liberal arts and in pure science and engineering, the university has schools of Law, Medicine and Dentistry. In affiliation with the Halifax Conservatory of Music it gives courses for the diploma of Licentiate of Music and the degree of Bachelor of Music. In affiliation with the Nova Scotia College of Pharmacy it gives courses leading to the degree of Bachelor of Pharmacy. The university is well equipped for its work and is constantly enlarging its sphere of usefulness. It has a large student body and admits students of either sex. The first site of the college was on the Grand Parade. In 1887 the college was removed to Carleton street, where the professional schools still are. In 1915 the Arts and Science departments were removed to the Studley estate, a beautiful site of 42 acres on the outskirts of the city, near the North West Arm. This was made possible by the results of a canvass for funds for building and endowment in 1912 which brought in $400,000. The buildings already erected on the new site are the Science Building, the cornerstone of which was laid by H. R. H. the Duke of Connaught, governor-general of Canada, and the Macdonald Memorial Library, the style of architecture chosen being 18th century Georgian. Many generous gifts have been made to Dalhousie, notably those of the late George Munro of New York, from 1879 to 1884, amounting to about $350,000, which did much to put the institution on a solid financial basis. Alexander McLeod, Sir William Young, John P. Mott, Dr. D. A. Campbell, Joseph Matheson and John Macnab have also made large gifts. Dalhousie University was put on the first list of the Accepted Institutions of the Carnegie Foundation. It is the chief institution of learning in eastern Canada, and draws students not only from all over the Dominion but also from Newfoundland and the West Indies. It is noted for the number of its graduates who have attained eminence in educational and professional life. It is non-sectarian, and is supported entirely by its endowment.

DALICHODACTYLY. The condition of having abnormally long fingers. See BRACHYDACTYLY.

DALIN, dȧ-lēn', **Olof von,** Swedish historian and poet: b. Vinberg, Holland, 29 Aug. 1708; d. Drottningholm, 12 Aug. 1763. He studied at Lund, visited Stockholm, where he received a minor public office in 1726. He began to publish the weekly *Svenska Argus* in 1733 which appeared anonymously. This was followed by 'Tankar öfver Critiquer' ('Thoughts About Critics') in 1736; 'The Story of the Horse and Aprilverk,' a series of political satires (1738); and 'Svenska Friheten' ('Swedish Liberty,' 1742). He then received a series of offices, first as tutor to the crown prince [illegible]751); secretary of the Swedish Academy of Literature (1753). He endured a short period of political exile (1756–61) during which he wrote his most famous work, 'Svea Rikes historia' ('History of the Swedish Kingdom'), which was published in three volumes (1746–62). He was ennobled in 1751, was made privy councillor in 1753 and remained at court as royal historiographer until his death. Besides the works already mentioned, he wrote several minor dramatic works and numerous poems, epigrams, etc. His style is characterized by great vigor and spirit. The best edition of his poetical works appeared at Stockholm (1782–83).

DALKEITH, Scotland, market town, six miles southeast of Edinburgh. It has a corn market, a large and commodious market hall, erected in 1854; manufactories of carpets, brushes and bricks, besides iron foundries and tanneries. There are large coal mines near by. Much truck gardening for Edinburgh is carried on in the neighboring country. Dalkeith arose around an ancient castle, which was long a stronghold. It was successively held by the Grahams, the Douglases, the Earls of Morton and the Earls of Buccleuch. Dalkeith Palace, the chief seat of the Duke of Buccleuch and Queensbury, built about 1700 on the site of the old castle, is a large square structure overhanging the North Esk. Three times English rulers have occupied the palace on visits to Scotland. Pop. 7,019.

DALL, Caroline Wells Healey, American author: b. Boston, Mass., 22 June 1822; d. 1912. She lectured frequently on theological subjects and on questions associated with the amelioration of conditions affecting woman and was a founder of the Social Science Association. For many years she conducted a class in literature and morals at her home in Washington. With Mrs. Pauline Wright Davis, she founded *Una*, a journal devoted to woman's rights and the pioneer publication of its kind in Boston. The writings of Mrs. Dall are devoted chiefly to a discussion of the rights of woman, and her work 'The College, the Market and the Court or Woman's Relation to Education, Employment and Citizenship' (1867), is a widely known contribution to that subject. She was an industrious literary worker, and wrote many other books, among which are 'Essays and Sketches' (1849); 'Woman's Right to Labor' (1860); 'Egypt's Place in History' (1868); 'Patty

Gray's Journey to the Cotton Islands,' and 'What We Really Know About Shakespeare' (1885); 'Nazareth' (1903); 'Fog Bells' (1905).

DALL, William Healey, American naturalist: b. Boston, 21 Aug. 1845. He was a special student in natural sciences under Louis Agassiz. In 1865–68 he accompanied the International Telegraph Expedition to Alaska, and from 1871 to 1884 he was on the United States Coast Survey of Alaska. In 1880 he became honorary curator of the United States National Museum, and in 1893 professor of invertebrate paleontology at the Wagner Institute of Science, Philadelphia. In 1884–1905 he was paleontologist to the United States Geological Survey. He has received many honorary degrees, including that of LL.D. from George Washington University in 1915. His publications number some hundred titles, mostly on scientific subjects. He wrote works on the natural history of Alaska, such as 'Alaska and Its Resources' (1870); 'Reports of the Mollusca of the Blake Expedition' (1880–90); 'Mollusca of the Southwestern Coast of the United States' (1890).

DALLAS, Alexander James, American statesman: b. Island of Jamaica, 21 June 1759; d. Trenton, N. J., 14 Jan. 1817. He was educated at Edinburgh, studied law in London and settled in Philadelphia in 1783. He became eminent at the bar, and was United States district attorney in Pennsylvania from 1810 to 1814. He was Secretary of the Treasury under Madison from 1814 to 1816 and in this capacity recommended to Congress the incorporation of a new United States Bank. For a short time he also served as Secretary of War. He originated a ~~definite financial~~ policy for the treasury and left it with a surplus of $20,000,000 within two years after he had found it bankrupt. He published 'Reports of Cases Ruled and Adjudged by the Courts of the United States and of Pennsylvania before and since the Revolution' (4 vols., 1790–1807); 'Address to the Society of Constitutional Republicans' (1805); 'Exposition of the Causes and Character of the War of 1812–15' (1815). Consult 'Life and Writings of Alexander James Dallas,' by his son, George M. Dallas (Philadelphia 1871).

DALLAS, George Mifflin, American diplomatist: b. Philadelphia, Pa., 10 July 1792; d. there, 31 Dec. 1864. He was the son of A. J. Dallas (q.v.). In 1813 he was admitted to the bar, and soon after entered the diplomatic service. In 1831 he was elected a United States Senator from Pennsylvania; was United States Minister to Russia 1837–39, and in 1844 was elected Vice-President of the United States. In 1846 his casting vote as president of the Senate repealed the protective tariff of 1842, though he had previously been considered a Protectionist. His course on this question aroused much indignation in Pennsylvania. He was United States Minister to Great Britain from 1856 to 1861. His principal published writings were posthumous, and include a 'Series of Letters from London' (1869), and a 'Life of A. J. Dallas' (1871).

DALLAS, Ga., town, county-seat of Paulding County; on the Southern and Seaboard Air Line railroads; about 34 miles northwest of Atlanta. There are cotton, yarn, hosiery mills, and several gold mines. New Hope Church, four miles from Dallas, was the scene of a sharp conflict betwen the armies of General Sherman and General Johnston on 25–28 May 1864. Pop. 1,259.

DALLAS, Ga., Battle Lines at. After the Confederate evacuation of Dalton (see DALTON, GA., MILITARY OPERATIONS AT), 12 May 1864, and the battle of Resaca, 14–15 May, Gen. Joseph E. Johnston's army retreated by way of Calhoun and Adairsville to Cassville, where General Johnston prepared to make a stand, and General Sherman closed in on him for battle; but Johnston abandoned Cassville during the night of the 19th, and next day crossed to the south side of the Etowah. Sherman occupied Cassville and Kingston, and prepared for another advance. As Johnston held the line of the railroad at Allatoona Pass and other points in advance of Marietta, Sherman concluded to turn those positions by moving from Kingston to Marietta by way of Dallas, a small town about 25 miles south of Kingston and 20 miles west of Marietta, and the converging point of many roads. On the 23d the movement began, but on the same day the Confederate cavalry discovered it, and Johnston divined its intention and prepared to check it by marching to Dallas and covering the roads leading to it.

On the 25th as the advance of Hooker's (Twentieth) corps neared Dallas it was discovered that Hood's Confederate corps held the cross roads at New Hope Church, four miles northeast of Dallas. Hooker concentrated his corps and attacked Hood late in the evening and was repulsed with a loss of 1,346 killed and wounded, and about 60 missing. Hood's loss was less than 400. During the night and early next day the rest of the army moved up on the right and left of Hooker and entrenched, McPherson's two corps, on the right, holding Dallas.

Sherman gradually extended to the left, skirmishing heavily all along the line, and on the evening of the 27th T. J. Wood's division of the Fourth corps attacked the extreme right of the Confederate army near Pickett's Mill and, after a most gallant effort, was repulsed with a loss of 1,224 killed and wounded and 318 missing. The Confederates reported a loss of 85 killed and 363 wounded. This engagement was a little over two miles northeast of New Hope Church.

There was now heavy skirmishing all along the line, some seven miles in length; and Sherman, still extending to the left, ordered McPherson, who was entrenched at Dallas, to close in on Hooker at New Hope Church, that Hooker might extend to the left; but McPherson deferred the movement until next day (28th), and was getting ready to make it when he was attacked. The Confederates made a desperate effort to seize his works, but were repulsed with a loss of some 390 killed and wounded. McPherson's loss was over 400, of whom 325 were killed and wounded and 54 missing in the Fifteenth corps, which bore the brunt of the assault. This was the battle of Dallas.

Sherman continued his movement to the left; McPherson left Dallas 1 June, and closed in on Hooker at New Hope Church; Hooker went to the left; all the wagon roads leading to Allatoona and Ackworth were secured. Allatoona was seized, also the railroad back to the Etowah, and 4 June Sherman was preparing to attack Johnston, at New Hope Church, when he found that he had abandoned all his works and fallen back to Kenesaw Mountain; whereupon Sherman moved to the railroad at Ackworth and Big Shanty, and the first stage of the campaign for Atlanta ended. The Union loss in the battles and constant heavy skirmishing near and at Dallas (25–31 May) was about 3,600 killed and wounded. Johnston reports the Confederate loss at 2,005 killed and wounded. The first stage of the campaign (6–31 May) cost the Union army 9,299 killed, wounded and missing; Johnston reports the Confederate loss for the same period at 5,807 killed and wounded. Consult 'Official Records' (Vol. XXXVIII); Van-Horne, 'History of the Army of the Cumberland' (Vol. II); Sherman, 'Memoirs' (Vol. II).

E. A. Carman.

DALLAS, Ore., city, county-seat of Polk County; situated on La Creole Creek and the Southern Pacific and other railroads; about 70 miles southwest of Portland. The industries are dependent upon the production of the fertile Willamette Valley, in which Dallas is situated. Flour mills, sash and door factories, sawmills, organs, leather and woollen factories and tanneries constitute some of the industries. Sandstone quarries in the vicinity furnish excellent stone. The industrial interests are promoted by good water power. Dallas was settled in 1849 and in 1891 was chartered as a city. It contains a Carnegie library. Pop. 2,124.

DALLAS, Tex., city, county-seat Dallas County, 270 miles north of the Gulf of Mexico on the Trinity River, navigable to that point, and on nine steam and five electric interurban railroads. The steam railroads are the Missouri, Kansas and Texas Railway; Missouri, Oklahoma and Gulf Railway; Houston, Texas Central Railway; Texas and Pacific Railway; Texas and New Orleans Railway; Gulf, Colorado and Santa Fé Railway; St. Louis and San Francisco Railway, and the St. Louis Southwestern Railway. The interurban railway lines are the Texas Traction Company to Denison, north 77 miles; Southern Traction Company to Waco, south 97 miles, and to Corsicana, southeast 56 miles; Northern Texas Traction Company to Ft. Worth, west 30 miles, and to Cleburne, southwest 67 miles. Dallas has a new union (steam) terminal station, opened to the public in 1916, representing an investment in building and grounds of over $6,500,000; and a new electric interurban station representing an investment in building and grounds amounting to $1,600,000.

Commerce, Industries.—Dallas is the centre of the famous black lands of the Southwest, the principal products of which are cotton, corn, wheat, oats, truck and fruit. As the largest inland cotton market in the world the Dallas Cotton Exchange handles 1,500,000 bales of cotton in a normal year. The 1914 census gave the number of factories as 412, capital invested $23,488,000, with a total output of $42,559,789. Dallas leads in the manufacture of cotton ginning machinery and in saddlery and harness. Other important industries are flour mills, portland cement plants, oil refinery, iron and metal works, brewery, packing houses, cotton seed oil mills, cotton compresses, grain elevators, etc. The largest wholesale jobbing and distributing centre of the Southwest, with 570 jobbers and manufacturers, that in a normal year do $262,000,000 business, Dallas is the distributing centre for automobiles of the Southwest, with large factories having assembling plants here, and in the sale and distribution of agricultural implements is second only to Kansas City. Dallas ranks 28th in postal receipts in the United States, is seventh in express business, sixth in telegraph business. It is the Southwestern headquarters for all classes of insurance business and is the home of the 11th District of the Federal Reserve Banking System, with 686 banks, whose capital and surplus amount to $49,972,500. There are 10 banks in the city of Dallas, whose resources on 1 Jan. 1918 amounted to $96,662,549, with deposits amounting to $80,143,274. The State Fair of Texas is the most successful institution of its kind in the world. It is unique in its organization, never having received State or Federal aid. All of its receipts are devoted to paying the expense of the annual fair and to making improvements upon its 162 acres of ground, which is the property of the city, being turned over to the city for park purposes with the exception of one month in the year during the annual fair. The plant was worth (1918) $2,200,000. As high as 1,001,400 admissions have been recorded during the two weeks of the fair. The permanent buildings are built of reinforced concrete and are The Coliseum, 150x200 ft., seating capacity 5,000; Textile and Fine Arts Building, 125x125 ft.; Exposition Building, 280x375 ft.; Ladies' Rest Cottage; Live Stock Pavilion, 124x192 ft.— cattle and swine barns are of reinforced concrete steel, with steel pens for the swine; Vehicle and Implement Building, 200x550; Grand Stand, 60x300; Automobile Building, 148x296. There are 19 individual and permanent exhibit buildings owned and erected by exhibitors.

Public Buildings, Etc.— Dallas is the convention city of the Southwest, with ample hotel facilities, unsurpassed by any city of its size; the Adolphus Hotel, the latest addition, 23 stories high, costing $1,600,000, with an addition or annex costing $1,000,000; and adequate convention halls. Notable among public buildings are the city hall, courthouse, public library, the cathedrals of the Sacred Heart and of Saint Matthew's, the city hospitals and Saint Paul's and the Baptist Memorial sanitaria. One of the longest concrete viaducts in the world connects the city proper with Oak Cliff, a residential section of the city on the west side; this was built at a cost of $657,466. Much activity has been displayed in recent years in street paving and the development of a comprehensive system of boulevards, under a city plan. On 1 Jan. 1918 Dallas had 160 miles of paved streets, with 325 miles of cement sidewalks. The parks of the city, tastefully laid out, now cover 400 acres, and with public playgrounds are being developed to cover eventually 3,500 acres easily accessible.

Government.— Dallas enjoys the commission form of government, having been one of the first cities to adopt this plan. The property in the city is assessed for taxation at $136,971,975, the city tax rate being $1.95, and the State and county tax rate being $1.10.

Schools, Churches.—An important, educational centre, the principal educational institutions are the Southern Methodist University, with cash assets of $3,000,000 and 660 acres of ground, which opened in 1915 with 800 students; Dallas University (Catholic institution for boys), an investment in building and grounds amounting to $500,000; the Baylor Medical College and 53 private schools. There are 3 high schools and 29 ward schools in Dallas, the city having an investment in buildings, grounds and equipment of $2,000,000. The scholastic population of Dallas is 27,229. Dallas has 154 places of worship, of all denominations.

Climate.—The following are the average or normal temperatures in degrees Fahrenheit at Dallas as shown in the Special Bulletin No. 5, United States Department of Agriculture Weather Bureau: January, 46.3; February, 50.9; March, 57.3; April, 67.7; May, 73.4; June, 81.4; July, 84.4; August, 82.5; September, 76.8; October, 66.4; November, 55.5; December, 53.9, and annual, 66.4. The relative humidity, as it affects evaporation, is a potent factor in keeping the human organism cool. At Dallas the average humidity for the year at 7 A.M., 90th meridian time, is 80 per cent, and the average at 2 P.M. is about 43 per cent for July, 53 per cent for August and 54 per cent for September. Maximum or highest temperature recorded at the local office of the United States Weather Bureau since it was established in Dallas October 1913 was 102° on 30 July 1914. The temperature for the year of 1915 did not go as high as 100°. There is generally a cool, fresh and invigorating southerly breeze from off the Gulf of Mexico throughout the summer months that adds much to the comfort of the inhabitants of Dallas, and when this is taken into consideration with the records of the temperature and humidity it can readily be seen why sun-strokes are almost unknown in this section of the country.

Population.—In 1885 the population of Dallas was 10,000; (1900) 42,438; (1910) 92,104; July 1917 the government estimate was 129,632 and the Chamber of Commerce and Manufacturers' Association estimate 1 Jan. 1918 (which includes suburbs not included in government estimate), 147,000.

GRANT S. MAXWELL,
Secretary of Dallas Chamber of Commerce and Manufacturers' Association.

DALLES, The, or **DALLES CITY,** Ore., county-seat of Wasco County; on the Oregon-Washington Railroad. It is about 30 miles northeast of Mount Hood, and on that portion of the Columbia River (on the Washington State boundary line) where the scenery is noted for grandeur. The Dalles contains Saint Mary's Academy, a Carnegie library and a hospital. It is situated in a sheep and cattle-raising country, hence its trade is largely in cattle and wool, live stock, grain and fruit. Fruits grow here in the Columbia Valley. Its chief industries are flour and grist milling and wool scouring, box factories, salmon and fruit canneries, lumber yards, machine shops, etc. A military post at Fort Dallas was established in 1838, and about the same time a mission was opened by the Methodist Church. The railroad station is known by the name of Dalles and the local name often used is Dalles City; but the name of the postoffice is The Dalles. It was incorporated in 1858. The government is administered by a mayor, elected annually, and a municipal council. The waterworks are owned by the city. Pop. 4,880.

DALLIN, Cyrus Edwin, American sculptor: b. Springville, Utah, 22 Nov. 1861. In his native West he came into close contact with Indian life, in the realistic and impressive portrayal of which he excels all other artists. He studied under Truman Bartlett in Boston and under Chapu in Paris, where Buffalo Bill's Wild West Show inspired his first equestrian statue, the 'Signal for Peace' (1890), which received a gold medal at the Chicago Exposition of 1893, and is now in Lincoln Park in that city; this was followed in 1899 by 'The Medicine Man' (Fairmount Park, Philadelphia), considered one of the most notable products of American sculpture. His other works include the marble statue of Sir Isaac Newton in the Congressional Library at Washington; 'Don Quixote,' which received a gold medal at the Saint Louis Exposition of 1904; the monument to the pioneers in Salt Lake City, and 'Peace or War' (1906); and 'The Redskin's Prayer' (1909). Consult *Brush and Pencil,* Vol. V, and Taft, 'History of American Sculpture' (New York 1903).

DALLINGER, William Henry, English scientist and clergyman: b. Devonport, England, 5 July 1842. He entered the Wesleyan ministry in 1861 and after being minister at Liverpool 12 years was governor of Wesley College, Sheffield, 1880–88. His microscopical researches began in 1870. He became fellow of the Royal Society in 1880, has been Rede lecturer to the University of Cambridge; lecturer at Oxford and at the Royal Institution and was president of the Royal Microscopical Society 1883–87. He has published 'Minute Forms of Life' (1886); 'The Origin of Life' (1878); 'The Creator and What We May Know of the Method of Creation' (1887); revision of Carpenter's The Microscope and Its Revelations' (1891).

DALMAN, däl'män, **Gustaf Hermann,** German Lutheran scholar: b. Niesky in Silesia, 9 June 1855. He was educated among the Moravians and was graduated from their theological school at Gnadenfeld. Here he was professor of the Old Testament and practical theology 1881–87. In 1887 he left the Moravians and joined the Lutherans and the same year received the degree of Ph.D. at Leipzig University. For the next 15 years he was a professor and finally the director of the Institutum Delitzschianum at Leipzig. Beginning with 1890 he has been associate professor of Old Testament Exegesis in the University of Leipzig. Since 1902 he has been on furlough and has been serving as director of the German Evangelical Archæological Institute in Palestine. He has been a voluminous writer, his writings covering quite a wide range in the various fields of theology. Several of his works have been translated into English. His most important productions are 'Christianity and Judaism' (German, 1898; English, 1901); 'The Words of Jesus considered in the light of Post-biblical Writings and the Aramaic Language' (Edinburgh 1902). He has been a profound student of the Aramaic, and issued a grammar of the language in 1894. It has not been translated into English.

DALMANUTHA. A place mentioned in the New Testament (Mark viii, 10). Rendell Harris conjectures that the name is a corruption from the Syriac. Other writers think Megiddo is meant. W. M. Thompson located it on the sea of Galilee, one mile north of Jarmuk, at a site now known as Ed-Delemiyak. Sir C. Wilson and H. B. Tristram suggest that the site is one and a half miles from Migdel.

DALMATIA. A crownland of Austria-Hungary forming part of the kingdom of Croatia-Slavonia-Dalmatia and situated along the eastern Adriatic coast. It is bounded to the north by Croatia, to the east by Bosnia-Herzegovina, to the south by Montenegro. The area is 4,956 square miles. There are about 500 islets of which about 50 are of appreciable size and importance, belonging naturally to Dalmatia and known generally under the name of Dalmatian Archipelago. The largest (exceeding 100 square kilometers) and most fertile are Brazza, Lessina, Curzola, Meleda, Lissa, Solta and Lagosta. The numerous channels, straits, gulfs, bays, fjords and the hills and rocks of the mainland branching from the mountain range of the Dinaric Alps, give the country a most picturesque aspect. The Gulf of Cattaro, which is in the extreme south of Dalmatia, is one of the finest harbors in Europe. The principal rivers are Neretva, Zrmanja, Krka and Cetina, but there are many rivulets and brooks whose course is interrupted by frequent cascades of incomparable beauty. The climate is moderate as the thermometer never shows below zero (C) in winter and the heat in summer is tempered by many winds. The most important towns are Dubrovnik (Ragusa), Zadar (Zara), Shibenik (Sebenico), Blato and Kotor (Cattaro). By a recent census the population of Dalmatia was computed to 645,666 consisting chiefly of Serbo-Croatians (about 95 per cent). According to the same census there were 510,669 inhabitants speaking Serbo-Croatian language, 3,065 persons speaking other tongues and 18,025 speaking Italian. Serbo-Croatian is the official language but the use of Italian, which is known to the majority of urban population, is also permitted. Notwithstanding the dearth of water and forests the vegetation of Dalmatia is very diverse. The rich forests were cut down by the Venetians for the construction of their mighty fleets. The fields sown with cereals of all description cover 11 per cent of the entire area. The chief products of Dalmatia are wine, which is of an exceptionally good quality, and olive oil. Agriculture is very popular and prosperous in the islands but the most usual industries and manufactures are almost totally absent. Shipbuilding, wine and oil-pressing are the principal industries. Cattle and horses are very scarce while sheep and goats are numerous and of good breed. Asphalt, lignite and salt are mined. The ports of Dalmatia are very active as the bulk of the Austro-Hungarian foreign commerce is conducted through them. There arrive about 20,000 merchant vessels every year. Olive oil, maraschino cordial, fish, meat, honey, wine and asphalt are exported. Cereals are a principal item of import. The ways of communication in the interior of the country are wholly inadequate chiefly on account of the rocky configuration of the soil, despite the good lesson which Napoleon I taught the inhabitants while he ruled the Illyrian provinces. There are about 145 miles of railway. Dalmatian waters teem with many varieties of delicious fish and fishing constitutes one of the chief resources of the inhabitants of the coast. Sardines and tunny-fish are caught in enormous quantities.

Education is obligatory between the ages of 6 and 12 and there is hardly a village to be found without at least one primary school. There are two theological seminaries at Zara and many secondary, naval, commercial and professional schools and agricultural colleges, all of which are supported by the Imperial Government. At Ragusa and Cattaro there are naval colleges which supply officers for the mercantile marine. In 1911 there were 458 elementary schools with 58,000 enrolled pupils.

Prior to the Roman invasion of Dalmatia the country was populated by the Illyrians against whom a military expedition was sent by Rome under the leadership of Consul Origul in the year 156 B.C. but the definite subjugation of that province was effected by Augustus on the occasion of pacification of the Pannonians A.D. 6. The Illyrians were occupying themselves chiefly with cattle raising, agriculture and seafaring. Dalmatian pirates are notorious in the history of navigation in the Adriatic. The language and customs of the Dalmatians soon gave way to the Latin, and Diocletian, born in Dalmatia, transferred his capital to Spalato ("Palatium"). The ruins of the imperial palace are still to be seen in that town. Upon the fall of the Roman Empire in 395 Dalmatia was apportioned to its eastern part only to be conquered, about a century later, by the Ostrogoth kings. In the course of the 6th century the Avars took hold of Dalmatia but had soon to yield it to the irresistible invasions of the Serbians who divided the entire province in several counties with Belgrade (Zara Vecchia) as the capital. The influence of Venice was felt in Dalmatia as early as the 10th century, but it was only in 1104 that Doge Dominico Minieli succeeded in defeating the Hungarian king, Koloman, who had effected a union with the Croatians and proclaimed himself king of Croatia-Dalmatia. The city of Belgrade was demolished by the Venetians. After the fall of the Republic of Venice (1797) Austria, by virtue of the Treaty of Campo Formio obtained sovereign rights over Dalmatia but had soon (1805) to cede it to Napoleon who incorporated that province in his famous Illyrian Kingdom. The little Republic of Dubrovnik (Ragusa) retained its autonomy until 1808 but Napoleon abolished it in that same year. By the Treaty of Vienna (1815) Dalmatia was again given to Austria. In 1869, when the Austrian Government introduced in Dalmatia universal conscription, a rebellion took place in Krivoshiya and Bocca di Cattaro and the Austrians suffered great losses in men and provisions. However the year 1881 saw a fresh insurrection which lasted until 1882 when it was put down with great cruelty by the Imperial army. Emperor Francis Joseph I, by his acts of 26 Feb. 1861 and 1 Jan. 1868, granted charters whereby Dalmatia forms part of the Triune Kingdom of

Croatia-Slavonia-Dalmatia whose King is the sovereign of Austria-Hungary. The head of the government in Zagreb bears the title of Ban of Croatia, Slavonia and Dalmatia. In the Imperial Parliament in Vienna Dalmatia is represented by 11 deputies elected by universal suffrage of whom nine are Croatians and two Serbians. The principal instrument of the public local government is the Diet (Sabor). Its power, organization and functions are defined by the constitution of the country. The seat of the local administration is in Zadar (Zara) and the executive authority is vested in the person of the governor appointed by the Austrian emperor. He is the chief of the provincial administration of the state, of the board of education, the public finances and the postal and telegraph services.

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DALMATIAN DOG. See DOG.

DALMATIC (*Dalmatica*), an ecclesiastical vestment, open at each side below the insertion of the sleeves, which are wide. It is the principal vestment worn by the deacon in the Roman Catholic Church when ministering at the Mass, or in processions and in other functions. It is also worn under the chasuble, by bishops, when they celebrate the Mass pontifically; and it is a part of the vesture of a king both in England and in continental European countries. It is commonly of silk; its color varies according to directions of the ritual. The dalmatic was originally a long under-garment of white Dalmatian wool, but little different from the Roman tunic, and not till the fourth century was it a distinctively ecclesiastical garment. At first it was worn only by the Roman deacons, but later its use extended throughout the whole Church. So, too, the use of the dalmatic as part of the solemn attire of bishops was at first restricted to the Pope, but afterward was conceded to all bishops. In the Greek Church a vestment answering to the dalmatic, called stoicharion, is worn by deacons in solemn functions, and in the same Church, the celebrating priest wears the stoicharion under the chasuble; but in this case the garment is always white. The two stripes, usually on the dalmatic, were originally purple, that is, a shade near scarlet, and were probably a survival of the *latus clavus* of the tunic of senators. See COSTUME, ECCLESIASTICAL.

DALMELLINGTON, Scotland, village of Ayrshire, terminus of a branch line of the Glasgow and South-Western railway, 15 miles northeast of Ayr. It is a coal mining and stone-quarrying centre, and was prominent during the Covenanting period. Pop. 1,500.

DALMORÈS, dăl-mō'-rĕs', **Charles,** French operatic singer: b. Nancy, 31 Dec. 1871. With the object of training as a violinist he entered the Conservatoire de Nancy. An accident to his arm obliged him to relinquish all hope of becoming a violinist and he took up the study of the horn, which he also studied at Paris. In 1888-94 he was engaged on the Lamoureux orchestra, becoming also a skilled 'cellist. In 1894 he removed to Lyons as teacher of the horn at the conservatory there. Dauphin here trained his voice and in 1899 he made a successful début as singer at Rouen. In 1906 he was engaged as tenor by Hammerstein at the Manhattan Opera House, New York, where he won fame which spread to Europe and brought many tempting offers from Continental opera houses. In 1910 he became first tenor of the Chicago Opera Company. His principal rôles are Nicias in 'Thaïs'; Julian in 'Louise'; Vinicius in 'Quo Vadis'; Samson in 'Samson and Delilah' and Herod in 'Salome.'

DALNY, dăl'nĭ, or **TAIREN,** but now generally Dairen, city and free port 20 miles north of Port Arthur belonging to Japan. It is situated on the Liao-tung Peninsula, which extends south into the Gulf of Pechili, China. It was intended for the eastern terminus of the Siberian Railway and was established as a commercial seaport by edict of the Tsar of Russia, dated 30 July 1899, and was thrown open to the commerce of all nations in December 1901. During the Russo-Japanese War it was occupied by the Japanese troops under Oku, 30 May 1904, following on the battle of Kin-chow. With the leased territory of Kwantung, the southern part of the Liao-tung Peninsula, it fell to Japan as the spoil of war under the Treaty of Portsmouth; and the lease from China, originally for 25 years, was extended to 99 years by treaty in March 1913. Dalny again became a free port in 1906. The harbor, in which vessels drawing 30 feet can enter at low water, is one of the finest and deepest in the Pacific, is ice-free all the year, and the surface of the bay is sufficient for all the shipping of China. It is protected by a breakwater 1,000 yards in length. The railway lines connect Port Arthur and Dalny with Mukden, Harbin and the East China railway system. The population is about 36,000. The area of the leased territory extends to 1,256 square miles, with a population of 522,489.

DALRYMPLE, Alexander, Scottish hydrographer: b. Hailes, near Edinburgh, 24 July 1737; d. London, 19 June 1808. In 1752 he went to India in the service of the East India Company and while there made hydrography his particular study. In 1795 he obtained the appointment of hydrographer to the admiralty, as well as to the East India Company. His most important publications are 'Discoveries in the South Pacific Ocean'; 'A Collection of South Sea Voyages'; 'A Relation of Expeditions from Fort Marlborough to the Islands of the West Coast of Sumatra'; 'A Collection of Voyages in the South Atlantic Ocean'; 'A Memoir of a

Map of the Land Round the North Pole'; 'Journal of the Expeditions to the North of California'; 'The Oriental Repertory.' He was also the author of many historical and political tracts.

DALRYMPLE, Sir David, Lord Hailes, Scottish lawyer and antiquarian: b. Edinburgh, 27 Oct. 1726; d. 29 Nov. 1792. In 1766 he was made lord of session with the title of Lord Hailes, and later a lord of judiciary. He published 'Annals of Scotland' (1786) and other works on Scottish history, both ecclesiastical, biographical and political, antiquities. He is mentioned in Boswell's 'Life of Johnson' as an intimate friend and correspondent of Johnson.

DALRYMPLE, James, 1st Viscount Stair, Scottish lawyer and statesman: b. Ayrshire, May 1619; d. Edinburgh, 25 Nov. 1695. In the Civil War he sided with Parliament, but soon relinquished that party and became professor of philosophy at Glasgow. He then adopted law as a profession, and in 1670 was made president of the Court of Sessions. He was adverse to the severe measures adopted against the Covenanters, and having excited the enmity of the Duke of York, lost his appointments and retired to Holland in 1682. Here he became a favorite with the Prince of Orange, who, after the revolution, created him Viscount Stair. Stair wrote 'The Institutes of the Laws of Scotland' (still a standard authority); 'Philosophia nova experimentalis'; 'Vindication of the Divine Perfections'; 'An Apology for his Own Conduct.' Scott has made Dalrymple's daughter, Janet, the heroine of the 'Bride of Lammermoor.' Consult Mackey, 'Memoirs of Sir James Dalrymple, First Viscount Stair' (Edinburgh 1873).

DALRYMPLE, John, 1st Earl of Stair, Scottish statesman: b. 1648; d. 8 Jan. 1707. He was son of James Dalrymple (q.v.). He was called to the Scottish bar in 1672, and his eloquence and ability soon gained him a leading place in his profession, as later in the Scottish Parliament. He became Lord-Advocate (1687). Under Charles II he suffered imprisonment twice for not sufficiently enforcing the persecuting acts, but held office in Scotland under James. He was largely instrumental in carrying out the 1688 revolution in Scotland, and for some time acted as the king's representative in that country, but his undoubted services have been somewhat discounted by his connection with the massacre of Glencoe in 1692. He assisted largely in bringing about the union between England and Scotland. Under Anne he was privy councillor for Scotland (1702). He succeeded his father as viscount in 1695 and in 1703 was created earl.

DALRYMPLE, John, 2d Earl of Stair, Scottish general; b. Edinburgh 20 July 1673; d. there, 9 May 1747. He entered the Cameronian Regiment in 1692, and in 1701 was appointed lieutenant-colonel of the Scots regiment of foot guards. In 1707 he succeeded to the earldom and became one of the Scottish representative peers, but still continued his military life, and distinguished himself in the campaigns of Marlborough, and more particularly at the battles of Oudenarde, Malplaquet and Ramillies. On the accession of George I he was appointed a privy councillor, and went on a diplomatic mission to France, where he attracted much notice by the splendor of his retinue, and also displayed great skill and address. He returned in 1720, and for the next 20 years he took an active interest in agricultural pursuits. In 1742, on the dissolution of Walpole's administration, he again entered public life and was sent as ambassador to Holland. He served later under George II at Dettingen, and was made commander-in-chief of the army of Great Britain. Consult Graham, 'Annals and Correspondence of the Viscount and First and Second Earls of Stair.'

DALSGAARD, däls'gärd, **Christen**, Danish artist: b. Krabbesholm, Jutland, 30 Oct. 1824; d. 1907. He studied at the Copenhagen Academy. He was made professor of drawing at the Academy of Sorö in 1862, and was elected to the Copenhagen Academy in 1872. His impressive delineations of Danish peasant life, showing a keen sense of observation and imbued with sincere sentiment, have justly caused him to be esteemed one of the typical masters of Denmark. Especially noteworthy are: 'Christmas Morning'; 'Jutland Peasants going to Communion'; 'Fisherman and Daughter'; 'Seizure for Debt'; 'One of the Wise Virgins'; 'Ansgar and Odbert Baptizing Mother and Child'; and 'The Farewell.'

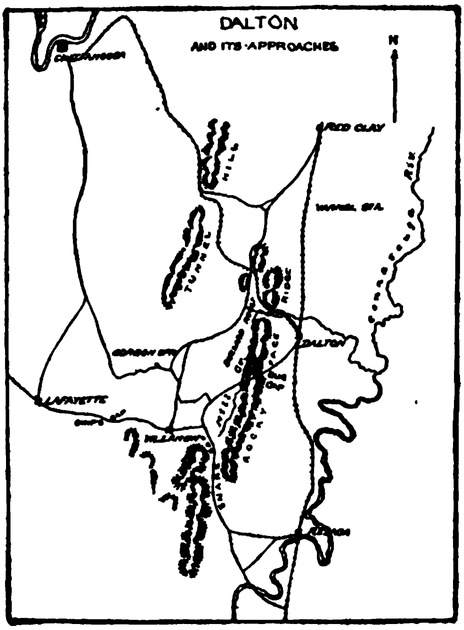
DALTON, John, English chemist and physicist: b. Eaglesfield, near Cockermouth, Cumberland, 6 Sept. 1766; d. Manchester 27 July 1844. He was educated at the Quakers' school in his native town and from 1781–93 was assistant at a boarding school at Kendal. Here he showed such a decided turn for mathematics that he obtained the position of professor of mathematics and natural philosophy in New College, Mosley Street, Manchester, in 1793. The same year he published his early meteorological observations and essays. In 1799, on the removal of New College to York, he resigned his chair, but continued to give private lessons in the same branches. In 1808 he commenced the publication of his 'New System of Chemical Philosophy,' which, containing his brilliant discovery of the atomic theory, produced an important revolution in the science, gave him a very high place among philosophical chemists, and spread his fame over Europe. He pursued diligently research in mixed gases, force of steam, elasticity of vapors and the effect of heat on gases and other important chemical actions. The Royal Society of London in 1826 admitted him a member, and unanimously awarded to him the first of two gold medals intended for those who had made the greatest discoveries in science. He was also elected member of the Institute of France, of the Royal Academies of Science of Berlin and Munich, and of the Natural History Society of Moscow. His papers were published in the *Memoirs* of the Literary and Philosophical Society of Manchester (of which he was president), in the *Philosophical Transactions*, in Nicholson's *Philosophical Journal*, and Thomson's *Annals of Philosophy*. His 'Meteorological Essays and Observations' were published in 1793. Consult 'Life,' by Lonsdale (1874); Roscoe and Harden, 'New View of the Origin of Dalton's Atomic Theory' (1896).

DALTON, John Call, American physiologist: b. Chelmsford, Mass., 2 Feb. 1825; d. New

York, 11 Feb. 1889. He was graduated at Harvard in 1844 and at Harvard Medical School in 1847. He was successively professor of physiology at the University of Buffalo, at the Vermont Medical School, at the Long Island College Hospital, and at the New York College of Physicians and Surgeons, of which he became president in 1883. He served as an army surgeon throughout the Civil War. His published works include 'Human Physiology' (1859); 'Physiology and Hygiene for Schools, Families and Colleges' (1868); 'The Experimental Method of Medicine' (1882); 'Topographical Anatomy of the Brain' (1885).

DALTON, Ga., city and county-seat of Whitfield County; on the Southern and the Nashville, Chattanooga & Saint Louis railroads; 100 miles northwest of Atlanta. It is a health resort, and the seat of Dalton Female College. Iron, manganese and limestone are found in great quantities in its vicinity and the city has a large trade in cotton, grain and fruit. It has canning factories, cotton compresses, flour mills, marble works, agricultural implement factories, car factory, a chair factory, lumber mills, etc. Dalton was settled in 1848 and was incorporated the same year. In 1863–64 it was a Confederate headquarters of Joseph E. Johnson defending the approaches to Atlanta and was the scene of considerable military activity. The government is vested in a mayor elected biennially, three commissioners and a board of aldermen. The municipality owns the waterworks, gas and electric-lighting plants. Pop. 5,324.

DALTON, Ga., Military Operations at (23–25 Feb. 1864, and 8–12 May 1864, including engagements at Buzzard's Roost Gap, Dug Gap, Rocky Face Ridge and Varnell Station). Dalton is in the northwestern part of Georgia, where the Chattanooga and Atlanta Railroad is intersected by that from Cleveland, Tenn. By rail it is 38 miles southeast of Chattanooga. When General Bragg was supposed definitely to have abandoned Chattanooga, 9 Sept. 1863, General Halleck ordered General Rosecrans to occupy Dalton, and there Bragg retreated after his defeat at Lookout Mountain and Missionary Ridge, 24–25 Nov. 1863. In February 1864 General Grant ordered General Thomas to seize the town. Thomas moved, reported that he could not carry the position, and the effort was abandoned. His movement cost the Union army about 300 killed and wounded, and the Confederates about 200.



Dalton, the first objective point of Sherman's Atlanta campaign, was held 30 April 1864, by Gen. J. E. Johnston, with 54,400 men. The approaches to the place were difficult, and it was practically impregnable. Early in May, Sherman concentrated his grand army in and around Chattanooga for his Atlanta campaign. It was made up of the armies of the Cumberland, Tennessee and Ohio, commanded respectively by Gens. Geo. H. Thomas, J. B. McPherson and J. M. Schofield, aggregating 98,797 men and 254 guns. The Army of the Cumberland had about 60,000 men, the Army of the Tennessee 25,000, and the Army of the Ohio 14,000. On 6 May the Army of the Cumberland was at and near Ringgold, the Army of the Tennessee at Gordon's Mill, on the Chickamauga, and the Army of the Ohio near Red Clay, on the Georgia line, north of Dalton. The four corps of Thomas and Schofield were ordered to move on Dalton in front, while McPherson with two corps moved through Snake Creek Gap. On the 7th McPherson was ordered to march from Gordon's Mills through the Gap to Resaca, 18 miles south of Dalton. He marched by way of Ship's Gap and Villanow, pushed through Snake Creek Gap, a wild defile, nearly six miles long, 15 miles south of Buzzard's Roost, and on the morning of the 9th drove back Grigsby's Kentucky cavalry brigade, and marched to within a mile of Resaca, then held by two brigades under General Cantey. Finding the place too strong to be assaulted, McPherson fell back to a strong position at the east end of the Gap. Meanwhile Thomas and Schofield had pressed forward. Thomas drove the Confederates in his front full through Buzzard's Roost Gap, and Schofield closed down on Thomas' left. On the 8th there was heavy skirmishing between Thomas and the Confederate divisions of Stewart and Bate at Buzzard's Roost and about six miles farther south a determined assault.

The road from Lafayette to Dalton passes through a cleft in the palisade, which had been deepened and widened, hence known as Dug Gap. Geary's division attacked this gap. Skirmishers were thrown out who drove those of the enemy from the foot of the ridge and up the road nearly to the summit, when two brigades were formed in double lines on either side of the road. The Confederates were driven clear to the summit. The position of the Gap could not be carried, and an assault on the perpendicular palisade south of it was ordered, where it was broken by a few clefts through which four or five men could move abreast. The men charged, a few reached the summit, to be killed or captured, and the assault failed. After a short breathing-spell another effort was repulsed with much loss. Still another attempt was made by a single regiment, but it also failed.

Everywhere the assault was repulsed, and the Federals withdrew after a loss of 306 killed and wounded, and 51 captured or missing. It is doubtful if the Confederate loss exceeded 30 men. At Varnell's Station Stoneman's and Wheeler's cavalry divisions had an engagement in which the loss was about 150 on each side, and Thomas pressed so vigorously in front of Buzzard's Roost that the heavy skirmishing attained the dimensions of a battle. By the 11th Sherman moved his army to pass through Snake Creek Gap. On the evening of the 12th Johnston was fully informed of the movement toward his rear, which had been covered by the ridge and the forests of the country, and he abandoned his position that night to give Sherman battle at Resaca. On the morning of the 13th Howard occupied Dalton. The Union loss around Dalton, 7–12 May, was about 830 killed and wounded; the Confederate loss not more than half that number. Consult ‘Official Records,’ Vol. XXXVIII; Van Horne, ‘History of the Army of the Cumberland,’ (Vol. II); Johnston, ‘Narrative’; Sherman, ‘Memoirs’ (Vol II); Cox, ‘Atlanta’; the Century Company's ‘Battles and Leaders of the Civil War’ (Vol. IV).

E. A. CARMAN.

DALTON, Mass., town in Berkshire County, on the Boston and Albany Railroad, five miles east of the city of Pittsfield. It has a public library; the industries comprise spark coil works, woolen factories and paper mills. Much of the paper used in government paper currency is manufactured at Dalton. Pop. 3,568.

DALTON-IN-FURNESS, England, town in Lancashire, three and one-half miles northeast of Barrow-in-Furness. In its vicinity are extensive iron works, rich hematite iron-ore mines, and the ruins of the magnificent abbey of Furness. Dalton Castle, an old tower in the town, was formerly associated with Furness Abbey. The painter Romney was born and buried here. It is connected with the Irish Sea by a canal three miles long. Pop. 10,762.

DALTONISM. See COLOR-BLINDNESS.

DALTON'S LAW, a principle discovered by the English physicist, John Dalton (q.v.), that in a mixture of gases which do not unite chemically, the pressure is equal to the sum of the pressures of all the gases in the mixture. See PNEUMATICS.

D'ALVIELLA, dăl-vyĕl'lă, **Count Goblet,** gōb-lā, Belgian savant: b. Brussels, 10 Aug. 1846. He was educated at Brussels and Paris and in 1879 married a Miss Packard of Albany, N. Y. He is a member of the Royal Academy of Belgium and of the Royal Asiatic Society of Great Britain. As correspondent of the *Independence Belge,* he went to India with Edward VII, then Prince of Wales; later he was envoy extraordinary to Constantinople. He was for some time director of the *Revue Belgique,* was Hibbert lecturer at Oxford University in 1891, and has published ‘Sahara and Lapland’ (1874); ‘Inde et Himalaya’ (1877); ‘Contemporary Evolution of Religious Thought in England, America and India’ (1885); Hibbert Lectures on ‘Origin and Growth of the Conception of God’ (1892); ‘The Migration of Symbols’ (1894); ‘Ce que l'Inde doit à la Grèce’ (1897); ‘Eleusinia de quelques problèmes relatifs aux mystères d'Eleusis’ (1903); ‘A travers le Far West, souvenirs des États-Unis’ (1906); L'Université de Bruxelles pendant son troisième quart de siècle’ (1909); ‘Croyances, rites, institutions’ (3 vols., 1911).

DALY, Arnold, American actor: b. Brooklyn, N. Y., 4 Oct. 1875. In 1892 he made his début in ‘The Jolly Squire.’ Thereafter he appeared in many successful plays and in 1903 produced in New York Bernard Shaw's ‘Candida.’ For the next six or seven years he appeared exclusively in Shaw's dramas ‘Mrs. Warren's Profession’ (1904); ‘You Never Can Tell’ (1904); ‘Arms and the Man’; ‘The Man of Destiny,’ etc. In 1913 he appeared in Birmingham's ‘General John Regan.’

DALY, Charles Patrick, American jurist and author: b. New York, 31 Oct. 1816; d. 19 Sept. 1899. He had a distinguished judicial career in his native city, becoming justice of the Court of Common Pleas in 1844, first judge of the court in 1857 and chief justice in 1871, retiring on account of age in 1886. He was president of the American Geographical Society from its incipiency until his death. His works include ‘First Settlement of Jews in North America’; ‘What We Know of Maps and Map Drawing Before Mercator’; ‘A History of Physical Geography’; ‘Historical Sketch of the Judicial Tribunals of New York’ (1855).

DALY, John Augustin, American dramatist and theatrical proprietor: b. Plymouth, N. C., 20 July 1838; d. Paris, 7 June 1899. In 1869 he opened his Fifth Avenue Theatre on 24th Street, New York; and after its destruction by fire in 1873 he opened its successor on 28th Street. In 1879 he opened Daly's Theatre on Broadway. Among his original plays are ‘Divorce’; ‘Pique’; ‘Horizon’; ‘Under the Gaslight.’ He also wrote: ‘Peg Woffington, a Tribute to the Actress and the Woman.’

DALY, Joseph Francis, American lawyer: b. Plymouth, N. C., 3 Dec. 1840; d. Yonkers, N. Y., 7 Aug. 1916. He studied law in New York and was admitted to the bar in 1862. He was a judge of the Court of Common Pleas 1870–96 and chief justice of the same court in 1896. He became a justice of the State Supreme Court in 1896 and in 1900 was appointed by President McKinley commissioner to revise the laws of Porto Rico. He was a member of the American Bar Association, the New York State Bar Association and the New York City Bar Association. He was one of the founders of the Players' Club and was its vice-president for a time. He was also a member of the Catholic Club, of which he was president 1894–99; and of many other societies.

DALYELL, or **DALZELL, Thomas,** Scottish soldier: b. about 1599; d. 23 Aug. 1685. He was taken prisoner fighting on the loyalist side at Worcester and afterward escaped to Russia, where he was made a general. Returning to England at the Restoration, he was made commander-in-chief of the forces in Scotland and made himself notorious for his ferocity against the Covenanters.

DALZELL, John, American lawyer: b. New York, 19 April 1845. He removed with his parents to Pittsburgh in 1847, was educated at Yale and after studying law was admitted to the bar in 1847. He has practised his profession in Pittsburgh; was attorney for the Pennsylvania Railroad Company for its western lines for many years and for many other corporations. He has been a Republican member of the 50th–62d Congress inclusive, for many years ranking member of Committee on Ways and Means; participated in the making of the Dingley and Payne tariff bills; member of Committee on Rules during speakerships of Reed, Henderson and Cannon; first elected chairman of that committee when committee was made elective; regent of Smithsonian Institution; and delegate to National Republican conventions of 1904 and 1908, and in each member of subcommittee of Committee on Resolutions that reported the platform.

DAMA, dă'ma, a genus of the deer family (*Cervidæ*), comprising the common fallow deer (*Dama vulgaris*) and the Persian fallow deer (*D. mesopotamica*). The name is also given to a species of large gazelle (*Gazella dama*) found in the Sudan. It is closely allied to the mohr (q.v.), which is often regarded as but a subspecies, but has no dark stripe on the flanks. Closely allied to it also is the aoul of Somaliland.

DAMAGES, the indemnity recoverable by a person who has sustained an injury, either in his person, property or relative rights, through the act or default of another; also, the sum claimed as such indemnity by a plaintiff in his complaint. Compensatory damages are damages allowed as a recompense for the injury actually received. Consequential damages are those which though directly, are not immediately, consequential upon the act or default complained of. Exemplary, vindictive or punitive damages are, in legal contemplation, synonymous terms. Exemplary damages would seem to mean such damages as would be a good round compensation, and an adequate remedy for the injury sustained and such as might serve for a wholesome example to others in like cases.

Where injuries are maliciously, wantonly or recklessly inflicted, the right of the jury to award punitive damages is said to be as old as the right of trial by jury itself and is not, as some seem to suppose, an innovation upon the rules of the common law. In England as early as 1763, it was declared that the jury ~~had done~~ right in giving punitive damages. (Hackle *v.* Money, 2 Wils. 205.) And now, both in England and in the United States, the doctrine of punitive damages seems to be well settled and the right of the jury to give such damages in a proper case cannot be shaken in any of the States by anything short of legislative enactments.

General damages are those which necessarily and by implication of law result from the default or act complained of. Special damages are such as arise directly, but not necessarily, from the wrongful act or default complained of. Parties entering into an agreement may estimate beforehand the amount of damages to result from a breach of the agreement and may prescribe in the agreement itself the sum to be paid by either of the parties to the other by way of damages for such breach. Such damages are called liquidated damages when sanctioned by the law. If, however, the agreement is such that the law refuses to adopt it, then the damages agreed upon will be regarded as a penalty, or as in the nature of a penalty. General damages need not be alleged in the complaint of the person injured, nor is it necessary that any specific proof of damages be given to entitle the party injured to recover. The legal presumption of injury in cases where it arises is sufficient to maintain the action. Whether special damage be the gist of the action, or only collateral to it, it must be particularly stated in the complaint, as the plaintiff will not be permitted otherwise to go into evidence of it at the trial, because the defendant cannot also be prepared to answer it.

To constitute a right to recover damages, the party claiming damages must have sustained a loss; the party against whom they are claimed must be chargeable with a wrong; the loss must be the natural and proximate cause of the wrong. Where there is no loss there is no right to damages, properly so called. A sum in which the wrong-doer is mulcted simply as a punishment for his wrong and irrespective of any loss caused thereby, is a «fine» or a «penalty,» rather than damages. Damages are based on the idea of a loss to be compensated, a damage to be made good. It is not necessary, however, that this loss should always be distinct and definite, capable of exact description, or of measurement in money. A sufficient loss may appear, from the case itself, to sustain an action. The law in many cases presumes a loss where a wilful wrong is proved; and thus damages are also awarded for injured feelings, bodily pain, grief of mind, injury to reputation and for other sufferings which cannot be made the subjects of exact proof and computation in respect to the amount of loss sustained. Consult Harris, ‹Treatise on Damages by Corporations› (Rochester 1894); Holmes, ‹The Common Law› (Boston 1881); id., ‹Essays on Anglo-Saxon Law› (ib. 1876); Lee, ‹Historical Jurisprudence› (New York 1900); Mayne, ‹Treatise on the Law of Damages› (5th ed., London 1894); Sedgwick, ‹Elements of Damages› (Boston 1896); id., ‹Treatise on the Measure of Damages› (8th ed., New York 1891); Sutherland, ‹Treatise on the Law of Damages› (3d ed., Chicago 1903); Watson, ‹Treatise on the Law of Damages for Personal Injuries› (Charlottesville 1901). See Contract; Tort.

DAMAN, dä-män', or **DAMÃO,** India, a seaport town in Hindustan, at the mouth of the Gulf of Cambay, on the Damanganga or river of Daman, 100 miles north from Bombay. It belongs to the Portuguese, who sacked it in 1531, retook it in 1558, and have kept possession of it ever since. It carries on some cotton weaving, fishing, ship building and several salt works. Pop. about 6,000. The Portuguese district here of the same name possesses valuable teak forests. It has an area of 160 square miles. Pop. about 32,700.

DAMAN, dă'man, the Syrian name for the coney of Scripture. See Cony; Hyrax.

DAMANHUR, dä-män-hoor', Egypt, town of Lower Egypt, capital of the province of Beheirah, an important railway centre and seat of cotton manufacture. Pop. 46,555.

DAMAR. See Dhamar.

DAMARALAND. See German South West Africa.

DAMASCENE, dăm'a-sēn, **Saint John** (Joannes Damascenus, John of Damascus), an illustrious theologian of the Greek Church in the 8th century, native of Damascus: b. about 676; d. about 755. He was a pupil of Cosmas and in 730 was persecuted for his active opposition to the Iconoclast heresy. The last of the Greek Fathers, he was the first to reduce to system the Church's dogmas and to classify the decrees of the General Councils concerning matters of faith, in the third part of his work 'The Fountain of Knowledge.' In the first part, 'Points of Philosophy,' he makes application to theology of the principles of Aristotle's *Dialectica;* the second part consists of a reproduction of Epiphanius' work 'On Heresies,' with additional notices of heresies condemned by the Church after Epiphanius' time; the third and most valuable part is the 'Precise Exposition of the Orthodox Belief.' In mediæval times the 'Precise Exposition,' translated into Latin in the 12th century, gave direction to the theological views and speculations of the schoolmen; it influenced also the trend of Arabian philosophy; and hence Damascenus has been denominated the «Father of Scholasticism.» Styled also the «Prince of Greek hymnodists,» the English titles of three of his most famous hymns are the well-known «Come, ye faithful, raise the strain»; «The Day of Resurrection,» and «Those eternal bowers.» Many other treatises are extant which bear his name as author, but of most of these the authenticity is doubtful. No contemporary account of his life has come down to us; the earliest biographical notice of him that we have dates from the 10th century, and that is unworthy of credit. The epithet «Chrysorrhoas,» that is, gold-streaming, bestowed upon him in his lifetime, testifies to his reputation for eloquence. He is recognized as a saint both in the Greek and the Latin Church.

DAMASCIUS, dạ-măsh'ĭ-ŭs, a philosopher, so called from his supposed native place Damascus, lived in the beginning of the 6th century. He is known as one of the most distinguished teachers of the Neoplatonic philosophy. In Alexandria he studied rhetoric under Theon and mathematics under Ammonius; and afterward in Athens his teachers were Zenodotus and Marinus, the successors of the more celebrated Proclus. Numerous fragments of his writings remain, one of which is entitled 'Doubts and Solutions Respecting the First Principles.' It is so mystical as to be almost unintelligible, but it is important to the history of philosophy from its frequent notices of earlier philosophers. It was edited by Ruelle (Paris 1889).

DAMASCUS (native name Dimishk-es-Shăm, Syria), a celebrated city, capital of the Turkish vilayet of Syria, finely situated on a plain, at the eastern base of the Anti-Libanus range and supposed to be the most ancient city in the world. It is six miles in circumference, and is surrounded by a dilapidated wall pierced by seven gates. Damascus, from the beauty of its surroundings, is called the «Pearl of the Desert.» The plain on which the city stands is of great extent, and is covered with the most beautiful gardens and orchards, irrigated by the waters of the Barrada (the Abanah of the Old Testament), forming a grove of more than 50 miles in circuit, rich in fruits, including oranges, lemons, citrons, pomegranates, mulberries, figs, plums, walnuts, pears and apples. So plentiful and cheap are fruit and foodstuffs, that it is almost a proverb that «you can sup or breakfast in Damascus for nothing.» Its interior by no means corresponds with its environs. The streets are narrow and crooked, paved with basalt, and have a gloomy and dilapidated appearance; they are generally in three divisions — that in the middle devoted to cattle and riders being the lowest, and of the same width as the other two. In most parts of the city the fronts of the houses are built with mud, and pierced by a very few small grated windows, with red painted shutters. They are low, with flat-arched doors, resembling those of stables, while a dunghill and pool of putrid water almost invariably stand before each door. In many of them, however, a singular contrast is presented between the dull, prison-like outer walls of gray mud and the richness within. These are of a quadrangular form, enclosing a court paved with marble, ornamented with beautiful trees and flowering bushes, and having copious fountains playing in the centre. The lower rooms on each side of the court are raised above its area, and open in front — their roofs and walls highly ornamented with figures of flowers and inscriptions, and a variety of arabesque devices. The furniture, also, is of the most splendid description. The best and wealthiest part of the city is the Moslem quarter, where the streets are wider and cleaner, the houses higher and better built, and the supply of water much more abundant than in any other part of the town. The Christian and Jewish quarters are the most miserable.

Among the places most worthy of notice in Damascus are the bazaars. They are merely long streets — the principal one about one and a half miles in length — covered in with high wood-work and lined with shops, stalls, stores and cafés. The shops are narrow and go only a short way back. There is a separate bazaar for almost every commodity exposed to sale, and all of them are patrolled by multitudes of confectioners and dealers in ices and cooled sherbets. In the midst of the bazaars stands the Great Khan, said to be one of the most magnificent structures of its kind in the world. It is an immense cupola, supported on granite pillars and built in part of alternate layers of black and white marble. Its gate is one of the finest specimens of Moorish architecture to be seen in the world. In this building, and in 30 inferior khans, purchases and sales are daily conducted by the merchants, who have their counting-houses near them. There are some 200 mosques: the principal, a magnificent edifice, was destroyed by fire 14 Oct. 1893. The interior was completely gutted and except for the long lines of Gothic columns and capitols, all is modern. There are three Latin monasteries in Damascus — those of the Franciscans, Capuchins and Lazarists. The principal Roman Catholic churches form part of the monastic buildings; there are, besides, a number of detached churches belonging to different sects in various parts of the city. Besides the more remarkable architectural objects mentioned, there are an extensive citadel, the castle of the Crusaders, and a seraĭ or palace, in which the pasha resides. The most interesting locality in the city is, perhaps, what is called «Straight Street,» mentioned in connection with the conversion of the apostle Paul. It is the most important, largest and busiest street in Damascus; has a corrugated roof; is one mile in length, and runs from east to west. The house of Judas, also, to which Ananias went, is still pointed out, as well as that of Ananias.

Damascus was formerly a great emporium of trade between Europe and the East; its transport trade declined with the opening of the Suez Canal; but it is still a large buyer and still imports English cottons and other goods. It is also a place of considerable manufacturing industry. There are a number of manufactories of silk, damasks, cotton and other fabrics; numerous cotton-printing and dyeing establishments, tobacco factories, copper and iron foundries and glass works. The manufacture of Damascus blades, for which the city was once so celebrated, no longer exists. Saddles and bridles, rich and highly finished, fine cabinet work and elegant jewelry, are among the manufactures of Damascus. Fruit is an article of export. Damascus is one of the holy cities of Islam and here the pilgrims assemble on their journey to, and separate on their return from Mecca. The tomb of Fatima, daughter and only child of Mohammed, is an object of special veneration. Buckle, the historian of civilization, is buried in the Protestant cemetery.

Damascus to-day is perhaps the most thoroughly Oriental in all its features and characteristics of any city in existence. Of its origin nothing certain is known. There is, however, abundant evidence of its great antiquity, as it is mentioned in Gen. xiv, 15, as existing 1913 B.C., and appears even then to have been a place of note. At subsequent periods it fell succesively under the power of the Israelites under David, the Persians, Greeks and Romans, attaining great eminence under the last. In 1516 it fell into the hands of the Turks. A Protestant mission and schools have long been in operation here. Beirout is the seaport of Damascus, and is reached by a road 70 miles long. There are three railroads entering the city, the main line running to Beirout. Gas, electricity and street cars have been introduced. Pop. estimated at about 250,000, of whom perhaps 25,000 are Christians, and 11,000 Jews. Consult Porter, 'Five Years in Damascus' (London 1870); Macintosh, 'Damascus and Its People' (London 1882); and articles by A. Fordor in *Nat. Geog. Mag.*, January 1911, and R. Hichens in the *Century*, February 1910.

DAMASCUS BLADES, swords or scimitars anciently made at Damascus, Syria. These famous weapons, used among nations little skilled in the metallurgic arts, long before the Christian era, and made familiar to European nations from the time of the crusades, long defied all attempts at imitation. It appears that the Indian wootz or carbonized iron was in ancient times exported from the region of Golconda in Hindustan (where, as well as in Persia, it is still manufactured by the original rude process), and at Damascus was converted into weapons. These were particularly distinguished for their keen edge, capable of severing heavy iron spears or cutting the most delicate gossamer fabric floating in the air; and for the peculiar watered appearance of the steel, which was covered with delicate black, white and silvery veins, parallel to each other or interlaced. The Damascus appearance may be given to iron by welding together bars of different degrees of hardness, drawing them down, and repeating the process several times. (See DAMASCUS IRON). Karsten suggests that by the use of bars of good steel the best Oriental blades may have been fashioned in this way. The "mosaic" process differed from the other by cutting the bar into short lengths and fagoting these pieces, the cut surfaces always being placed so as to face outward. Blades of great excellence were thus produced, but still inferior to the genuine Damascus. It was not till after the investigations of General Anossoff in the first half of the 19th century that successful reproductions were obtained. These researches led to the establishment of works at Zlatoosk in the Ural Mountains, where Anossoff manufactured Damascus steel by processes of his own invention. According to his best method 11 pounds of iron were melted in the crucible with one-twelfth as much graphite and one thirty-second part of scales of iron. All his sword blades were tempered in boiling grease. The process of bringing out the watered appearance was accomplished by the use of a diluted acid, which acts more upon the ground than upon the lines. The Zlatoosk weapons proved to be of properties similar to those of the old Damascus blades. General Anossoff with one of them cut through floating gauze. Bones and nails may be cleft without injury to blades tempered for such use, and other steel tempered to the same point may be nicked by them without causing a gap. Their elasticity is so great that one may put his foot upon the end of the blade and bend it to a right angle, when it will fly back perfectly unchanged. General Anossoff died in 1851, and his successors at the works failed to produce the remarkable blades for which the establishment had become celebrated.

DAMASCUS IRON, or DAMASCUS TWIST, iron produced by the following method, which is supposed to be similar to the process anciently followed in the manufacture of the celebrated Damascus blades (q.v.). Twenty-five alternate bars of iron and mild steel, each about two feet long, two inches wide and one-quarter inch thick are united by welding; the fagot being drawn into a bar three-eighths inch square, is cut into lengths of five or six feet. One of these pieces is heated to redness, and one end is held firmly in a vise, while the other is twisted by a wrench or tongs, which shortens the rod to half its length and makes it cylindrical. If two of these twisted pieces are to be welded together, they are turned in diverse directions, one to the right and the other to the left; these are laid parallel to each other, welded and flattened. If three rods are used, the outside rods turn in a direction the opposite of the middle one, and this produces the handsomest figure. By these operations the alternations of iron and steel change places at each half revolution of the square rod, composed of 25 laminæ, the external layers winding round the interior ones; thus forming, when flattened into a ribbon, irregular eccentric ovals or circles. The fineness of the Damascus depends upon the number and thickness of the alternations.

DAMASK, a textile fabric, the ground of which is bright and glossy, with vines, flowers and figures interwoven. At first it was made only of silk, but afterward of linen and woolen. According to the opinion of some, this kind of weaving was derived from the Babylonians; according to others, invented at a later period by the inhabitants of Damascus, from which latter place it is known to have derived its name. The true damasks are of a single color. In modern times the Italians and Dutch first made damask; and Europe was supplied, as late as the 17th century, from Italy alone, chiefly from Genoa. But the French soon imitated it, and now surpass the Italians. Damask is made in great quantities in Germany, chiefly in Upper Lusatia. Dunfermline is the chief seat of the manufacture of damask linen in Scotland, and Lisburn and Ardoyne in Ireland.

To trace the origin of the art of weaving, or to ascertain the name of the artisan whose necessities led him to devise the crude appliances capable of being used in the production of even the very coarsest woven material, would be a hopeless task indeed, separated, as we are, from a period so exceedingly remote by the impenetrable gloom and obscurity which must ever enshroud the events of three or four score centuries ago. And yet we are safe in assuming that the ability to produce woven fabrics by means of a loom, no matter how elementary in construction, far antedates all written history, carrying us back to those early ages when the first rays of the sun of progress were faintly discernible above the horizon of time, awakening within our humble ancestors the desire for those things, which when obtained served to lighten their toil, and at the same time form part of the foundations of the noble structure, to which successive generations have contributed their share, and which we call civilization.

Coming down to a later period, however, we are enabled to gather authentic information regarding the degree of progress made in the art of weaving. Trustworthy records dating as far back as 2000 B.C. reveal the fact that the weavers of ancient Egypt were far advanced with the production of plain woven fabrics, many excellently preserved fragments of fine linen, which have been taken from the mummy cases, of that period, testifying not only to the reverence with which they regarded the embalmed remains of their illustrious dead, but also to their skill and proficiency as weavers.

In the Bible also we find numerous references to the products of the loom. Job speaks of his days as being swifter than a weaver's shuttle (Job vii, 16). We also read that the draperies of the tabernacle and the veil of the temple were woven fabrics, richly embroidered with various colors. These allusions to the art of weaving, and others too numerous to mention, are scattered profusely throughout the pages of the sacred volume; while heathen writers of antiquity frequently allude to weaving as an art which was held in the highest esteem, and which furnished a favorite occupation for people representing every grade of society, from those who dwelt in the marble halls of princes down to the occupants of the most humble dwellings.

Nor was skill in weaving confined to one locality or people; an art so essential to the comfort and welfare of humanity at large must speedily have become the common property of widely separated races; consequently we find that the Babylonish weavers of the year 1000 B.C. were celebrated for the richness and quality of their woven fabrics; while at the same period the patient Hindu and the stolid Chinese were producing fabrics of the finest texture on looms of the most primitive description.

From this it is obvious that the ancient races were familiar with the principles of fabric construction and that they were able to produce a considerable variety of elementary weaves by using different varieties and counts of yarn in combination with each other; yet there is nothing to show that they were acquainted with any form of loom, the mechanism of which made possible the production of intricate floral or ornamental designs, such for example as could easily have been woven on the draw loom of a later period, or by its successor, the highly improved Jacquard power loom of the 20th century. This obvious drawback, however, they endeavored to overcome by means similar to those employed by modern manufacturers of textiles, who, in order to meet the demand for showy and inexpensive fabrics of a certain description, are accustomed to arrange either the warp or filling in the form of a series of stripes of contrasting colors, harmoniously arranged together or else by changing the color of both warp and filling at such intervals as a previously devised pattern indicates, are enabled to produce an extensive variety of checkered patterns.

Designs of this character the weaver of ancient times found no difficulty in creating, but any large ornate or floral patterns with which he was familiar were obtained either by printing, or the skill of the embroiderer, or when considered desirable, a combination of both added to the woven material after it had passed from his hands, and which as a result cannot be classed with those fabrics which, produced entirely on the loom, are valuable on account of the elaborate nature of the designs with which they are embellished, as much as by the costliness of the materials employed in their construction.

It will thus be seen that a loom which could only be used in the production of a comparatively restricted variety of designs was sure to be superseded sooner or later by one of a more highly developed type, which would allow the decorative instinct of the early textile artist greater opportunity to express the ideas suggesting themselves to him.

In due time a loom capable of accomplishing these results was invented, probably in China, where, like so many other relics of the long forgotten past, it may be seen in operation at the present day, although long since consigned to the rubbish heap in all progressive countries.

From China the draw loom, as it came to be called, found its way to other parts of the globe. But it remained for the weavers of the ancient city of Damascus, the capital of Syria, to develop the possibilities of the new loom to the utmost extent, with the result that in time they established a large manufacturing and export trade in the beautiful silken fabric which soon became widely known as damask, taking its name from that of the city to which for centuries it brought wealth and renown, and in the manufacture of which the Damascene excelled all competitors.

Stated as briefly as possible, it may be said that the draw loom tie-up was a compound arrangement, one part of the harness being controlled by a lad known as the draw-boy, the other part controlled by shafts for the purpose of subdividing the warp, so as to form the fine ground weave peculiar to damask fabrics. Just as the weaver was about to throw the shuttle across the lathe, the warp, of which there may have been five, six, seven or more ends to each mail, according to the quality of damask desired, was raised *en masse* by the draw-boy in accordance with the requirements of a previously painted pattern, all the remaining warp being left down. The shuttle would thus have passed under the warp raised and over the warp left down without interlacing or forming cloth, had it not been for the supplementary arrangement of harness shafts, through which the entire warp was drawn, for the purpose of enabling every end to be used separately.

For each pick one of these shafts would be raised and one depressed, the others remaining undisturbed, the shaft which had been raised lifting every eighth end from among the mass of warp left down, the shaft which had been depressed carrying down with it every eighth end from the mass of warp raised, while the shafts which remained in a neutral position were so constructed as to permit the lifting of one portion of the warp and the sinking of the remainder as called for by the design, without interfering with the shed or passage of the shuttle. By this means the pattern was formed and the warp and filling were interwoven so as to produce an eighth shaft satin or any similar weave required.

During the wars of the Crusades the draw loom, along with many other things oriental, found its way into various European countries, thereby aiding greatly the development of weaving as applied to silk damask, brocade, velvet and other fabrics; the great artists of the Middle Ages not considering it beneath their dignity to supply the necessary designs for these rich textiles. For centuries, however, the draw loom remained practically the same as when first introduced, but in the year 1604 a Frenchman named Simblot devised a method by means of which the draw-boy was enabled to raise the warp while standing at the side of the loom, instead of the top, as had been the custom previously.

In England also, during the 17th and 18th centuries, patents were taken out for several devices intended to render the services of the draw-boy unnecessary; these, however, soon passed from public view, but the draw-boy remained, toiling away at his monotonous task for many a day after the mortal remains of Jacquard had crumbled to dust.

In the United States the manufacture of the finer grades of silk and cotton damask and upholstery fabrics in general is of comparatively recent origin, the vast majority of looms devoted to this industry being located in Philadelphia, with lesser numbers scattered throughout New York State, New Jersey, Connecticut and Virginia.

Thirty-five years ago the business was in its infancy, but «mighty oaks from little acorns grow,» and to-day the manufacture of upholstery goods is one of the most important industries of the country, which, with allied trades, such as yarn-spinning, dyeing and the manufacture of textile machinery, provides the means of livelihood for tens of thousands of operatives, and at the same time is a standing monument to the business enterprise of the American manufacturer. Nor have we by any means reached the limits of our development in this direction; the remarkable inventive ingenuity of the American artisan, which in many other lines of business has practically placed him beyond the reach of competition, will not be likely to fail him when applied to the weaving industry.

William Laird Turner,
Teacher of Jacquard Designing, Philadelphia Textile School.

DAMASKEENING, the art of inlaying iron or steel with other metals, especially gold and silver. It is also known as damascene work. This art is of great antiquity. Herodotus mentions a dish so ornamented; and the shields of some of the forces of the Samnites who fought against Rome were damaskeened. This method of ornamentation was formerly much used in Damascus and is found in modern Persian objects of art. The most beautiful specimens are produced by cutting into the metal with a graver and other tools proper for engraving on steel, and afterward filling up the incisions with a pretty thick gold or silver wire. The cuttings should be made in a dovetail form, so that the wire which is inlaid may adhere the more strongly. An inferior style of damaskeening can be produced by the electrotype process. The pattern is etched on the steel, and gold or silver deposited in the etched lines.

DAMASKIN, Yoann, or DAMASCENUS. See John of Damascus.

DAMASUS, the name of two popes. 1. Saint Damasus I was of the Hispanic race: b. Rome, about 304; d. 384. From an early age he was employed as an inferior minister in the service of the Roman see. He was elected to the papacy (366); but as his election was displeasing to a strong faction in the city they set up a rival Pope, Ursinus. In a riot between the supporters of the two claimants of the papal chair in the Liberian Basilica, represented now by the church of Santa Maria Maggiore, 137 persons, men and women, lost their lives; and Ammianus Marcellinus, the pagan historian, whose testimony is naturally hostile, declares that the ardor of the rivals to seize the episcopal seat surpassed the ordinary measure of human ambition. But ecclesiastical writers of the time make no mention of the 137 persons said to have lost their lives on this occasion, and its authenticity rests on the narrative of Ammianus alone. Prætextatus, the magistrate, who restored tranquillity to the city, is said to have remarked to the successful Pope, «Make me bishop of the city of Rome and I will straightway be a Christian.» Damasus was on terms of intimate friendship with Saint Jerome, who was his secretary and counsellor, and it was at his pressing instance that Jerome made a new revision and translation of the sacred Scriptures. In his pontificate the Emperor Valentinian I, 370 A.D., enacted a law designed to correct a grave abuse which had arisen in the Church — the custom of priests and monks receiving from wealthy penitents, especially women, gifts and legacies for themselves. Valentinian's law now made such gifts and bequests void; further it forbade ecclesiastics and monks to frequent the houses of widows and virgins under severe penalties. It is said that Pope Damasus himself suggested this law to the emperor, as a means of correcting the abuse at which it was aimed. His feast is observed 11 December. 2. Damasus II: b. Bavaria; d. Palestrina, 9 Aug. 1048. At an early age he was ordained a priest. Later he was consecrated bishop and received the appointment to the diocese of Brixen in Tyrol. In 1047 he was elected Pope, but lived only 23 days after being raised to the pontificate.

DAMBUL, dăm-bool′, **DAMBOOL,** or **DAMBULLA,** a village in the island of Ceylon, at the junction of four lines of road, 70 miles northeast of Colombo. It takes its name from the rock Dambul, a large mass of gneiss and mica schist which rises 550 feet above the surrounding plain, and contains a number of caves, one of them with a long inscription relating to the government of Ceylon in the 12th century, and another with a colossal statue of Buddha hewn out of the rock. The priests of Buddha still officiate in these cave temples.

DAME (Lat. *domina,* mistress), a title of honor which long distinguished high-born ladies from the wives of citizens and of the commonalty in general, and which still is the legal title in Great Britain of a baronet's or a knight's wife. In consequence of the greater courtesy shown toward women of higher rank, arose the custom of prefixing the word *ma* to *dame,* as a special proof of veneration and homage. Hence, too, the Virgin-mother was called in France *Notre Dame* (*our* lady, as if no single Christian could exclusively claim the privilege of serving her with the homage of his heart). The daughters of the king of France, as soon as they came into the world, were called *madame*; and this was also the sole title of the wife of the king's eldest brother. In England, the word dame, though not much used, is now applied to married women of all classes. It is also applied particularly to the mistress of a small elementary school or boarding-house at boys' schools. *Madame* is shortened into madam, a usual term of address for ladies in general, but still also a word of honor, applicable, in particular cases, to majesty itself.

DAME AUX CAMÉLIAS. See Lady of the Camellias.

DAMES OF THE REVOLUTION, an American society organized in 1896, and composed of women above the age of 18 years, of proved descent from ancestors who, either as military, naval or marine officers, or officials in the service of any one of the 13 original colonies or States, assisted in establishing American independence during the War of the Revolution, or between 19 April 1775, when the hostilities began, and 19 April 1783, when they ceased.

DAME'S VIOLET. The genus *Hesperis,* of the natural order *Cruciferæ,* or mustard family, the only American representative of which is *H. matronalis.* The genus belongs to Europe and Asia, and the American plants have escaped from cultivation. The pale purple flowers, sweet-scented at night, are found in fields and on roadsides in southern New England, westward to Kansas, and also in North Carolina. Other common names, mostly from England, where it is a very common flower, are Queen's or dame's gillyflower; night-scented gillyflower; damask violet, etc. The flower is extremely cultivated, and garden varieties are found in all tints from purple to white.

DAMIANA, dă-mĭ-ā′nạ, a drug derived from the leaves of South American, Mexican and Central American species of *Turnera,* especially *Turnera diffusa.* The botanical relationships of the various species are not well known. The chemical components consist of volatile oil, resin and bitter principles, and the drug, therefore, acts as the aromatic bitters. It was formerly supposed to have aphrodisiac properties. It is widely used in many disreputable quack remedies that are practically worthless.

DAMIANI, dā-mē-ä′nē, or **DAMIANUS, Petrus, Saint,** one of the fathers of the Church: b. Ravenna 1007; d. Faenza, 23 Feb. 1072. In infancy he was abandoned by his mother and then treated inhumanly by one of his brothers who gave him shelter, but another brother, Damianus, undertook his guardianship and gave him a good education. In gratitude, Petrus assumed the name Petrus Damiani, Damianus' Peter. For some years he conducted schools in Ravenna, but at the age of 30 joined a community of hermits and 1041 was elected to be their abbot. The renown of his piety, sanctity and wisdom having spread widely, brought to his cell people high and low to entreat his prayers or his counsel, and popes and emperors did not disdain to solicit his advice. Made cardinal and bishop of Ostia, 1057, he prevailed on Benedict X, irregularly elected by the dominant faction of the Roman nobility, to resign 1058, and 1062 he induced the anti-Pope Honorius II to forego his claims to the Roman see. He was an intensely zealous advocate of the reform of the Church and correction of the flagrant abuses which were widespread among the clergy in his time. In his manifesto, well styled by him ‹Liber Gomorrhinus› (Book of Gomorrha), he exposes, without regard to the dignities held by the offenders, the vices and the unspeakable enormities by which they brought discredit on the Christian profession. Had not the interests of religion demanded it, such outspokenness would have been inexcusable and an offense against public morality. Another of his works bears the title, ‹De Correctione Episcopi et Papæ› (of correcting a bishop and a Pope). All his life he practised the utmost austerities of the hermit. By decree of Pope Leo XII his name was added to the roll of Doctors of the Church, and 23 February was appointed as his feast-day. For his works consult Migne, ‹Patrologia Latina› (cxliv, cxlv); and for biography L. Guerrier.

DAMIANISTS, or **ANGELISTS,** disciples of Damian, the monophysite patriarch of Alexandria, in the 6th century. They professed a belief in only one nature in Christ. The Council of Chalcedon, in the 5th century, had condemned the heresy held by the Damianists in the 6th century. It is also the name given to the Sisters of Saint Clare, a Franciscan order of nuns, which had its first convent at Saint Damiano, Assisi.

DAMIANUS, famous rhetorician of Ephesus in the 2d century, mentioned by Philostratus in his ‹Lives of the Sophists.› He was a pupil of Ælius Aristides and of Adrianus, whose methods he taught.

DAMIEN, dā-myäṅ, **De Veuster, Joseph**, Belgian missionary: b. near Louvain, Belgium, 3 Jan. 1840; d. Molokai, Hawaiian Islands, 10 Aug. 1889. He was educated at the University of Louvain; joined the Order of the Sacred Hearts of Jesus and Mary in 1863 and soon after was sent by his superiors as missionary to Hawaii. In 1873 he requested to be attached as chaplain to the Molokai leper colony. Here he found his life work. He at once set about improving the housing conditions of the settlement, the food supply and the water, which was none too good. He founded schools, built a church, partly with his own hands, and instituted religious worship among these unfortunates. About five years before his death he noticed the incipient stages of the fell disease in his own body. From that time until his death he identified himself fully with the other colonists, beginning his sermons usually with the address, «We Lepers.» Consult Pamphile, 'Life and Letters of Father Damien' (1889); Stevenson, Robert Louis, 'Open Letter to the Rev. Dr. Hyde,' and Stoddard, 'The Lepers of Molokai' (1885).

DAMIENS, Robert François, French fanatic: b. Tieuloy, Artois, 1715; d. Paris, 28 March 1757. He enlisted as a soldier, and was afterward a servant in the college of the Jesuits at Paris, but in 1738 left this service in order to marry. He then served in different houses of the capital, robbed one of his masters, a Russian, and saved himself by flight. His mind was disordered when he returned to Paris at the end of 1756. In the beginning of the next year he went to Versailles, took opium for two or three days, and prepared for the crime which he attempted 5 January. As Louis XV was on the point of getting into his carriage Damiens stabbed him in the right side. The wound was of a trifling nature. Damiens did not attempt to escape. When questioned he said he never intended to kill the king, which he might easily have done. The most cruel tortures he bore with resolution, and could not be induced to confess that he had any accomplices. He asserted that he should not have committed the act had he been bled, as he requested, and that he thought it meritorious. He was condemned to be torn in quarters by horses, and the sentence was executed on the Place de Grève at Paris.

DAMIETTA, Egypt, town in Lower Egypt, on one of the principal branches of the Nile, 125 miles north-northeast of Cairo; lat. 31° 25′ N.; long. 31° 5′ E. It is irregularly built, and contains some fine mosques, bazaars and marble baths. Damietta was at one time a very important place, with 80,000 population, and carried on an extensive foreign trade, but is now eclipsed by Alexandria. The weaving of cotton fabrics is the principal industry. Rice, fish and fruit are exported. A bar at the mouth of the Nile prevents large vessels from reaching the town, compelling them to anchor outside, and to load and unload by means of small craft of from 30 to 60 tons burden. A military school and cotton-factory were established here by Mehemet Ali. In 1219 Count William of Holland, with his fleet of 12 ships, manned chiefly by men of Haarlem, by means of a high platform built on their masts and a scuttle let down, captured the outlying tower, broke the great chain between this and the mainland and captured the city. In commemoration of this event, the city of Haarlem bears on its shield a cross and a sword between four stars, with the motto «Virtus Vim Victus» (Courage conquers force) and the carillon of bells, nightly at nine o'clock, sounds out the «Damietje.» The ancient town of Damietta (*Tamiáthis*) stood about five miles nearer the sea, or farther north. The danger to which it was exposed, however, from its position on the shores, induced the Egyptian caliphs to change its position, and to remove it to where the modern town now stands about the year 1251. The present town contains many antique columns and blocks, supposed to have been brought from the old city. It is the terminus of a railway from Cairo. Pop. 29,354.

DAMMAR, a resin derived from various plants, principally *Agathis dammara* and *A. australis*, both members of the pine family, or the trees themselves. These are natives of Molucca and the East India Islands, also of the Philippines and New Zealand. Dammar is exuded from the main stems and also from the roots of the plants. Fossil dammar is called kauri (q.v.). In some regions, notably in the mountains of Sumatra, the resin bursts forth in profusion from spontaneous fissures. In other regions artificial incisions are made in the trees, with a yield of resin correspondingly greater. Dammar comes into the market in large masses, or small pieces. It is yellowish, transparent when in small pieces, smooth and brittle, breaking with a clean, glassy fracture and it is readily reduced to powder. It is intermediate in hardness between colophonium and copal. Chemically it contains traces of ethereal oil, dammarolic acid and two resins. It is widely used in the manufacture of varnishes.

The same name is applied in commerce to the resin of other and unrelated trees. Thus the dammar of shipyards is obtained from a species of *Canarium*, an amyridaceous tree, while black dammar is a kind of pitch derived from the same genus. *Shorea robusta*, a tree, yields pitch and resin used in Indian dockyards, and sometimes also called dammar. Dammar is also occasionally confused with kinds of copal; thus, the resin of *Vateric indica* (*Dipteraceæ*) is sometimes known as dammar or piny dammar, of which the piny varnish of India is compounded. One of the Australian species, *A. robusta*, has been grown in some parts of California with fair success.

DAMMARA. A genus of coniferous trees now known as *Agathis*. See Dammar; Kauri.

DAMMOOD, a river in British India, which rises in the district of Ramghur and flows through Bengal, east, southeast and south a distance of 350 miles. Rich deposits of coal and iron are found in its valley.

DAMOCLES, a native of Syracuse, and one of the courtiers and flatterers of the tyrant Dionysius the Elder. His name has become proverbial in consequence of a well-known anecdote related of him as illustrative of the uncertainty of human greatness and felicity. He had been extolling the grandeur and happiness of Dionysius, whereupon the latter invited him to a magnificent banquet, where he would be regaled with regal fare and royal honors. In the midst of the entertainment, however, Damocles happened to look upward, and perceived a naked sword suspended over his head by a single hair. The sight of this filled him with dismay, and taught him at what a sacrifice of mental peace and personal security the enjoyments and splendors of royalty may be purchased.

DÁMODAR, dä-mō'där, a river of Bengal, in India, which after a southeast course flows into the Hugli, just above the James and Mary Sands and below Calcutta. A little below the mouth of its chief tributary, the Barákhar, which it receives from the north, the Dámodar becomes navigable. The valleys of these two streams contain the coal-fields which produce about four fifths of the whole amount of coal mined in British India. Length about 350 miles.

DAMON AND PHINTIAS (not PYTHIAS), two illustrious Syracusans, celebrated as models of constant friendship. Phintias had been unjustly condemned to death by Dionysius the Younger, tyrant of Sicily, but obtained permission to arrange his affairs in a neighboring place on condition that his friend should remain as a pledge of his return. Damon surrendered himself at the prison, ready to suffer death instead of Phintias if he did not return at a fixed time. Unexpected impediments detained him. Damon, still fully convinced of the faithfulness of his friend, was on the way to the place of execution, and the people began to murmur and to pity his credulity, when Phintias suddenly rushed through the crowd into the arms of his friend. While they demanded each to die for the other, Dionysius himself approached, pardoned them and entreated them to admit him, a third in their friendship. Schiller has described this adventure in an excellent ballad, 'Die Burgschaft,' and it is the subject of a popular English drama.

DAMPER, a plate in an air-draft or flue, for the purpose of controlling the fire by regulating the area of the passage for the ingress or egress of air as the case may be. Dampers are of various forms. They are to the air-pipe or flue what the valve or faucet is to the duct for steam or liquids. The dampers of furnaces are either in the door of the ash-pit, to regulate the ingress of air, or in the course of or on top of the chimney, to close the egress of the volatile results of combustion. In the latter form they are used in almost all metallurgic furnaces.

In locomotive engines, a kind of iron venetian-blind, fixed to the smoke-box end of the boiler in front of the tubes; it is shut down when the engine is standing, and thus stops the draught and economizes fuel, but it is opened when the engine is running.

In pianofortes, certain movable parts, which are so arranged as to press upon the wires and check their vibration whenever the finger leaves the keyboard. Perfect damping is difficult to obtain, but when efficient it enhances brilliance of execution and distinctness of harmony in a composition.

DAMPIER, dam'pēr, **Alfred**, Anglo-Australian dramatist: b. London, 28 Feb. 1847. He began as an actor at Stratford-on-Avon and in 1873 he acted Mephistopheles in his own version of Goethe's 'Faust.' He visited the United States, Canada and South Africa. Returning to London he produced several of his own plays. From there he went to Australia and took over the Alexandra Theatre and renamed it the «Australia.» Here many of his plays were produced, himself and his wife acting leading rôles in them. Later on his son and his daughter also played leading rôles in their father's productions. Among his dramas are 'The Bush King'; 'Waratha'; 'Under the Southern Cross', and 'Robbery Under Arms.' Some of his numerous dramatic pieces were written in collaboration with Garnet Walch and W. L. Lincoln.

DAMPIER, William, English navigator: b. East Coker, Somerset, June 1652; d. London, March 1715. In 1673 he served in the Dutch War and subsequently engaged in a band of privateers, as they called themselves, although in reality pirates, with whom he roved on the Peruvian coasts. Dampier, wishing to obtain some knowledge of the northern coast of Mexico, joined the crew of Captain Swan, who cruised in the hopes of meeting the annual royal Manila ship, which, however, escaped them. Swan and Dampier were resolved to steer for the East Indies and they accordingly crossed the Pacific and after various adventures Dampier and others were left ashore on Nicobar Island. After making several trading voyages in the Eastern seas he entered as a gunner in the fort at Bencoolen. Upon this coast he remained until 1691, when he found means to return home. In 1697 he published an account of his voyage round the world, which had a great success and was supplemented by a second volume in 1699. He now obtained command of a ship in the king's service fitted out for a voyage of discovery. In this he made important explorations on the coasts of Australia and New Guinea, giving his name to Dampier Archipelago and Strait. His last two trips around the world 1703–07 and 1708–11 were commercial enterprises. Dampier's writings include 'A Voyage Round the World' (1697); 'A Discourse of Winds' (1609); 'Vindication of the Voyage to the South Sea' (1707); 'Voyages to the Bay of Campeachy' (1729). They bear all the marks of fidelity; and the nautical remarks display much professional and even philosophical knowledge. His observations on natural objects are also extremely clear and particular.

DAMPIER, the name of several places in Australasia: (1) Dampier Archipelago, a cluster of about 20 small rocky islands off the northwest coast of Australia, in lat. 21° S., and long. 117° E., divided by the Mermaid Strait in two groups; in the east is Rosemary, the largest island. (2) Dampier Island, off the northeast coast of New Guinea, with a volcano about 5,250 feet high. (3) Dampier's Land, a peninsula of western Australia, fertile and well watered, lying between King Sound and the Indian Ocean. (4) Dampier Strait, separating Neupommern (off Papua) from Rock Island. (5) Dampier Strait, separating the island of Waigiu from the northwest extremity of New Guinea, the safest and easiest passage between the Indian and Pacific oceans. It is 70 miles long and 35 miles wide.

DAMPING-OFF, the rotting of seedlings and cuttings in the seed-bed and the cutting bench, usually just above the surface of the soil. The immediate cause is a soil fungus (usually *Artotragus* or *Pythium debaryanum*, though other fungi may produce the same effect) which feeds upon decaying organic matter until it obtains a favorable opportunity for attacking a living host. This opportunity is generally afforded by a weakened condition of the seedlings or cuttings due to a more or less stagnated atmosphere highly charged with moisture and of rather high temperature. The fungus gains entrance to the weakened stems which soon turn brown or black. The foliage quickly becomes infested and sometimes in a single night a whole seedbed or bench full of cuttings may become a rotting mass with no healthy plants left. With careful management the trouble can be avoided. The propagating medium should be clean, sharp sand, which should be thoroughly drenched when the bed is watered, the excess water passing quickly away in perfect drainage. The bed should never be allowed to become dry. In short, both seedlings and cuttings should be kept growing steadily and sturdily. The drenching washes the spores of the fungus down through the sand. Should a bed become infested the healthy plants should at once be transferred singly and with as little soil as possible to fresh quarters. Neither freezing nor drying the soil will kill the fungus, which can live for months when growth is impossible. Sterilizing the sand or soil with steam is sometimes resorted to, the sand being heated for several hours. Less frequently plants in the open air are attacked. In the greenhouse and nursery experience in management will count for much.

DAMPS, certain deleterious gases which are released in mines. See After-damp; Choke-damp; Fire-damp; Lamp, Safety Lamp.

DAMROSCH, dăm'rŏsh, **Frank Heins**, American musician: b. Breslau, Prussia, 22 June 1859. He was trained by his father, Leopold (q.v.), and in 1882 became conductor of the Denver Chorus Club and supervisor of music in the public schools of that city. He was chorus master at the Metropolitan Opera House, New York, from 1885 to 1891, and in 1892 organized the People's Singing Classes. From 1897 to 1905 supervisor of music in the public schools of New York; from 1898 to 1911 director of the Oratorio Society; since 1893 director of the Musical Art Society; since 1905 director of the Institute of Musical Art.

DAMROSCH, Leopold, German musician: b. Posen, Prussia, 22 Oct. 1832; d. New York, 15 Feb. 1885. He was graduated from the University of Berlin, and began the practice of medicine; but his love for music predominated, and in 1864 he gave up his medical profession and started on a tour as violinist. He met with great success and on his return to Posen was appointed musical director at the Stadt Theatre. He subsequently held a similar post in Breslau. Coming to the United States, he was made leader of the Arion Society in New York, founded the Oratorio and Symphony societies of that city and was successful in introducing German opera at the Metropolitan Opera House. He published several cantatas, overtures and numerous pieces for the violin.

DAMROSCH, Walter Johannes, American musician: b. Breslau, Prussia, 30 Jan. 1862. He is a son of Leopold Damrosch (q.v.), and has been a resident in the United States since 1871. He inherited the musical talent of his father, and succeeded him in his enterprises. In 1894 he founded the Damrosch Opera Company for the production of Wagner. Since 1903 he has been director of the New York Symphony Orchestra which he also reorganized. He is the special exponent of the Wagnerian school of music, and has conducted operatic performances in all the large cities, proving himself a most acceptable leader. His compositions include an opera founded on Hawthorne's tale of ‹The Scarlet Letter› with which he toured the United States (1894); ‹Manila Te Deum,› a sonata produced in New York (1898); ‹Cyrano de Bergerac,› an opera in four acts (1913); and the incidental music for ‹Medea› and ‹Iphigenia› for the Greek Theatre at Berkeley, Cal., in 1915. In 1914, Columbia University conferred on him the degree of doctor of music.

DAMS. To dam (originally, to stop up) is to obstruct or restrain the flow of a liquid. In engineering, a dam is a barrier to constrain or keep back a body of water. Dams vary in structure as widely as the physical character of their sites, the purposes for which they are constructed and the materials used. Every dam is, in a sense, a special adaptation, and may only be classified by referring it to some more or less varying type.

The art of dam building is coeval with civilization when the stream from the mountains, spending itself in the arid plain, was diverted for irrigation. The gardens and the water-wheels of Damascus are back of history. The Nile Valley, the Euphrates-Tigris plain, the Oxus and Jaxartes, and much of India, developed civilization in the application of the waters to the land, and this will be the history of their restoration. It was a time of mighty endeavor in hydraulic engineering, little understood in humid lands, demanding a high social organization and a closely knit state. Cyrus turned the Euphrates from Babylon and an empire fell and rose. Lake Moeris regulated the floods of the Nile in the days of Joseph, and its operation is credited with the seven fat and the seven lean years by some antiquarians; and Bahr Jussuf (meaning, the water carrier) still leads to the Fayum basin. Modern Egypt has built the barrage across the Rosetta and Damietta mouths of the Nile for the continuous irrigation of the delta, and the dam at Assouan puts under service more than 6,000,000 acres of new lands, nearly doubling agricultural Egypt.

The old Hindu anicut turned the flow of formidable rivers into irrigation canals, and as a rock-fill with long paved slope and an apron down stream, it serves the engineers of India to-day. The ancient «tanks» of India are natural depressions closed by a bank of earth, sometimes of great height and miles in length, formed probably by basket carriage and consolidated by tramping. The Veranum Tank still in use has a water area of 35 square miles held by a dam of clayey earth 12 miles long.

The protection of lands against flood by embankments, levees or dykes, belongs to primitive times. Along the Yellow River

("China's Sorrow") the Chinese built levees in double line with cross-banks, so that the failure of the front line at any point by undercutting or other cause would only inundate the check immediately behind. The Po and Adige of northern Italy were embanked in remote times and the history of these works is of great interest.

The basket-work dam of moderate height on alluvial streams was long since devised, and from this has evolved the modern bank protection of braided willow mattress in use on Western rivers. The primitive neighborhood grinding-mill led the head-race up-stream to a dam of simple type.

The utilities widen in approaching the modern era. The stream flow of the growing season no longer suffices for the needs of irrigation and the surplus is impounded for larger areas and the time of need. The uncertain navigation of natural streams no longer satisfies commerce, and canal systems follow with extensive storage and feed-water developments, and this again, with steam navigation, gives way to the direct improvement and the canalization of rivers by means of fixed or movable dams. Growing cities need water supplies, a demand now universal, and often extraordinary structures are required. Industries develop with the water power, the turbine makes higher heads available and changes the problem of dam construction for power purposes; and finally comes the electric generator and distant transmission of power to satisfy further demands.

The United States contains water power capable of enormous development, in fact, more than tenfold all the power now in use. Next to the land itself the running streams are the most valuable economic asset. The future may well see an era of dam and reservoir building, in the humid as well as in the arid regions, for the better equalization of the flow of streams, in the interest of navigation, the reclamation of alluvial lands, the development of water power, and the creation of fisheries. The acre of water may be made even more valuable than the acre of land.

Embankments.—Embankments for restraining water are widely applied and have special names: as levees and dykes for protecting lands, banks forming canals, coffer-dams, reservoir embankments and the embankment with spillway adjunct for impounding water, the latter being called a dam.

The levee is built of the alluvium of river bottoms to restrain flood overflows. It is given sufficient freeboard above the greatest known flood, the top width is usually greater than the height and the side slopes are very flat, sometimes as low as five or six to one. The site is cleared of all humus and other vegetable matter and well broken, so as to bond the embankment to the natural ground, and all such material is excluded in forming the embankment. A "muck-ditch" is made when deemed necessary, and "buck-shot" or other water-tight material is puddled in and carried up into the embankment as a core.

Many hundred miles of levees have been built along the Mississippi River and its tributaries, some of them of very large proportions. When built according to the best practice, well seasoned and turfed over, failures are very rare, though floods often stand against them for weeks and the material is comparatively mobile when saturated. Failures have been due to insufficient height and the chopping effect of waves, but especially to lack of maintenance and of care at critical periods. The crawfish burrowed through at the turf line when its removal was omitted, and the board fences built in the levee to intercept this pest, decayed and weakened the levee. In northern latitudes the muskrat has also been a nuisance, as in the embankments of the reservoir system at the head-waters of the Mississippi River built for the purpose of increasing the low water flow.

Canals frequently skirt the sides of valleys or contour slopes, partially in excavation with part or full bank on the lower side. The material for forming such banks is generally far superior to that available for levee construction. The slopes are usually flat, from two to three on one, and a water-tight core or face is added in permeable ground, or the entire prism may be given a puddle lining when the percolation is liable to be serious. Sheet piling has been driven in such banks, but this divides the bank and is not now considered good practice. The unwatering of navigable canals in the winter time is also bad practice, as it subjects the inner face to frost action.

Canals are carried across water courses and valleys on supporting embankments, sometimes of great magnitude. Such embankments are given easy slopes and care exercised in forming a water-tight prism above, so as to avoid saturation and the resulting instability.

Ditches for irrigation and hydraulic mining sometimes reach the dignity of large canals, requiring care in the formation of banks. The soil of their location is usually of fine tilth with an admixture of adobe, and such channels generally "seal" quickly with the fine sediment carried in the flowing water of certain seasons.

The embankment used as a coffer-dam usually encloses some large site, as for the construction of a canal lock or for rock excavation in the dry, and is of a temporary character. Suitable material may be dumped from a trestle, the mass of material formed in water by dumping from a height being usually sufficient. In a notable case, a recent contract for a rock channel in the Saint Mary's River, a heavy embankment more than a mile long was formed of dredged material to a maximum height of 30 feet, and rock, estimated as wet excavation, was taken out in the dry at a large profit. No great care was taken in this embankment, except to provide suitable material and sufficient mass.

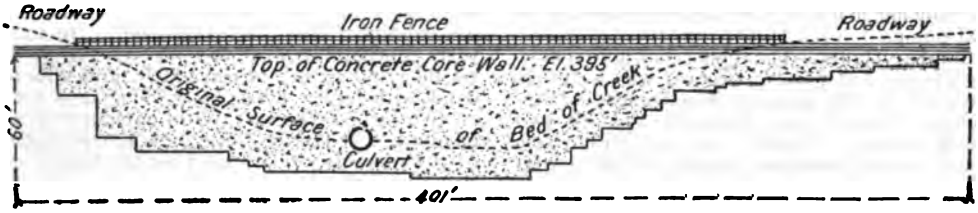
The reservoir embankment proper is usually for a storage or distributing reservoir, as for a municipal water supply. Such reservoirs are often 30 feet deep and the embankments are formed with great care from selected material placed in thin layers, watered and rolled. The inner face is lined and protected by a face-wall, a pavement of brick, stone pitching, or even riprap in some large storage reservoirs. The height of the embankment varies with the supporting ground.

Earth Dams.—The impounding embankment, or earth dam, is usually carried across some drainage line between steep valley slopes, so as to make a reservoir in the valley expanses above, and generally seeks to store a large proportion of the run-off. An ample spillway on an independent site is provided to carry the extreme flow of the valley when the reservoir is full.

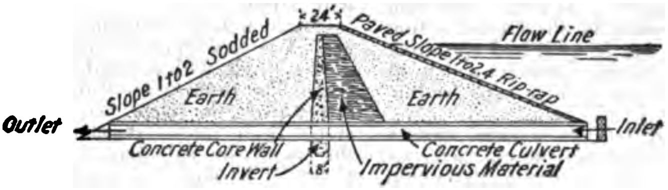
Earth dams are made of carefully selected material, preferably gravel containing enough clay to make a water-tight puddle. Too much clay is to be avoided: it may range from 5 to 30 per cent of the remainder, according to the kind of material. The water slope being more or less saturated should be much flatter than the dry slope, the approved practice being a slope of three horizontal to one vertical. The earth is built up in shallow layers which are thoroughly compacted by rolling, trampling by horses or solidified with water.

Earth dams fall usually within four classes: (1) The homogeneous bank of earth; (2) the bank of earth with puddle core; (3) the bank of earth with a core of masonry or sheet piling; (4) the bank of earth puddled on the water slope.

The object of the masonry core is chiefly to cut off water seeping through, not to resist the hydrostatic pressure. The thickness of the core walls at the water level is usually one-seventh to one-sixth of the head in the reservoir.


Roadway
Iron Fence
Roadway
Top of Concrete Core Wall. El. 395'
Original Surface of Bed of Creek
Culvert
60'
401'

LONGITUDINAL SECTION



TRANSVERSE SECTION

Earth Dam with Concrete Core Wall. Tomhannock Dam: Water Supply of Troy, N. Y.

Earth-dams have failed by over-topping from insufficient spillways or deficient free-board, from saturation and sloughing of the rear slopes, and from cutting out around pipes carried through the base. Embankments subject to water action should have slopes much in excess of the so-called «natural» or dry slope. Present practice tends to an impermeable up-stream face and upper toe wall or intercept to a safe depth with good drainage behind, thus developing the full stability of the material. Pipe lines through made banks are to be avoided, and in any location great care is needed to prevent seepage along the pipe line. The minimum thickness at the top is 10 feet, and 30 feet is regarded as a safe maximum.

The hydraulic-filled dam is probably a departure in the right direction. Dams of large section are filled by water carriage or by dumping from a height, the finer material up-stream, and having very flat slopes. Such a dam is in reality a mound, and can be made of a wide variety of material, the stability depending upon a moderate ground-water plane through the body of the fill rather than on impermeability. Such plane should not be sufficient to produce springs that will disturb the material, and the fill can be tightened or «sealed» by means of roily water or mud against the up-stream face. Such dams are sometimes built with wood core walls and sluiced only on the up-stream side.

Besides the Tomhannock Dam here illustrated may be mentioned the following notable earth dams:

The Ekruk Dam (India) is 7,300 feet long and 72 feet high, the reservoir holding 24,870,000,000 gallons.

The Belle Fourche Dam (South Dakota) is 6,493 feet long, and has a maximum height of 122 feet. It is 19 feet thick at the top and 620 feet at the base. It is built of heavy clay, in 6-inch layers, packed by steam rollers. The up-stream face is covered with heavy concrete slabs. The reservoir holds 66,500,000,000 gallons.

The Gatun Dam (Canal Zone) is 7,700 feet long, 115 feet high, 100 feet wide at the top and 2,019 feet at the base. It contains 21,146,000 cubic yards of earth. The hydraulic fill has a base 1,200 feet wide.

The Lahontan Dam (Nevada) is an earth fill of gravel and silt built up in 4-inch layers. It is 1,300 feet long and 124 feet high. The thickness at the bottom is 620 feet, and at the top 20 feet. On the water side it has a facing of riprap 24 inches deep.

The San Leandro Dam (California) is 500 feet long and 125 feet high. It is 28 feet thick at the top and 1,700 feet at the base. About one-third of the material was sluiced in by the hydraulic method.

The Tabeaud Dam (California) has a length of 636 feet and a height of 120 feet. It is 20 feet thick at the top and 620 feet at the base.

It is built of red gravelly clay in 6-inch layers, which were sprinkled and rolled, trampled by horses and grooved lengthwise by cartwheels. The up-stream slope is puddled and covered with a loose rock fill.

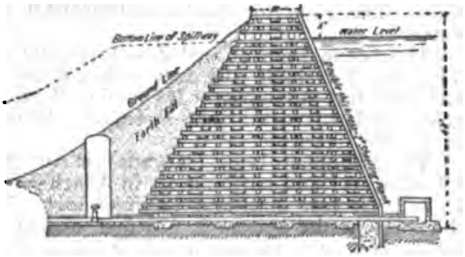
The Arrowhead Dam (California) is the second highest earth dam in the world — 222 feet. It is 850 feet long, is 20 feet wide at the top and 950 feet at the base. It has a core wall of concrete 207 feet high, 20 feet thick at the base and 10 feet at the top. The earth was dumped dry and hydraulicked into place.

The Calaveras Dam, an adjunct of the San Francisco water supply, built 1913–16, is the highest earth dam on record. It is 1,260 feet long, with a maximum height of 240 feet above bed rock. It is 25 feet thick at the top and 1,312 feet at the base. The material was sluiced in, the centre being the finest clay and silt deposited in still water to simulate lacustrine clay. It was washed out of borrow pits down an open channel, the clay content varying from 20 to 50 per cent, the remainder being sand and gravel. The flowing material was raised to the dam by mud pumps.

Timber Dams.—The timber dam across flowing streams for power purposes was well-nigh universal in the pioneer development of the country. Timber was plentiful and its uses widely familiar. Wooden wheels with horizontal axes utilized moderate heads, and these were also limited by the height of banks, so as to avoid excessive flowage with sufficient pond so that the flow of the dry season could be used in the daylight hours.

Such dams were usually built for heads of 6 to 16 feet, though the Connecticut River Dam at Holyoke had a height of 30 feet. This dam was gradually undermined by the erosive action of the water falling over it, as it had no apron. Better heads were often produced by a dam at the head of some rapid, with a race leading down stream.

Timber dams were built in a great variety of forms, much depending on the character of the site and the material available. A common type was the crib or «cob-work» structure with the pockets filled with stone, having a broad base, sheeted up-stream and banked with earth, on the down-stream side, the spillway and apron dropping in steps. Piling was sometimes driven, capped and sheeted to an apex like the roof of a house, the spaces between piling being filled with stone and the up-stream toe banked with earth. Frame dams were also built, a sheeting of timber being supported by triangular frames resting on mudsills; the up-stream slope was flat, usually two to one, the toe being covered by a bank of earth. Log dams were cribbed up and sheeted up-stream like frame-dams; and dams were built of piling and sheeting alone, driven into the river bed.



Cross-section: Crib Dam, Basin Creek, Montana.

Timber dams have lasted well where the height has not been excessive, the upper parts have been easily renewed when decayed or worn out, and they have been exempt from wholesale failure with disastrous results. Most of the failures on record have been due to lack of a proper apron, the water running over gradually cutting away the foundation. They will always be used in timber regions for manufacturing lumber and with sluiceways for driving logs. No material equals timber in resisting water shock and vibration, and its use will be preferred by many. Under water, timber is everlasting, and it will always be a useful material to the engineer.

A large proportion of the small water powers have been abandoned, and with the development of the turbine higher heads have been sought. The electric generator and transmission has greatly enlarged the water-power field, and this has accentuated the tendency toward higher dams and larger units. In recent years Portland cement has become cheap and reliable, and timber less available, and concrete dams with higher heads are coming into use.

Brushwood dams are useful on small streams having a soft bottom. Saplings and even trees of considerable size are used for the larger constructions, the branches being laid up-stream. Stone is loaded upon the brushwood sufficient to sink it, and gravelly soil is thrown on to fill the interstices. These dams are carried up in several alternate courses of brush and gravel, and are either planked on the face or covered with riprap.

Some notable examples of the timber dam are: The New Hartford dam, 232 feet long and 21 feet high, with a width at the bottom of 68 feet. The timbers are 9 to 12 inches thick and 6 feet apart, the spaces between being filled with stone. Both faces are planked with oak, and the up-stream side has a long graveled earth slope. This dam has stood a freshet of water 10 feet deep flowing over the top of the dam.

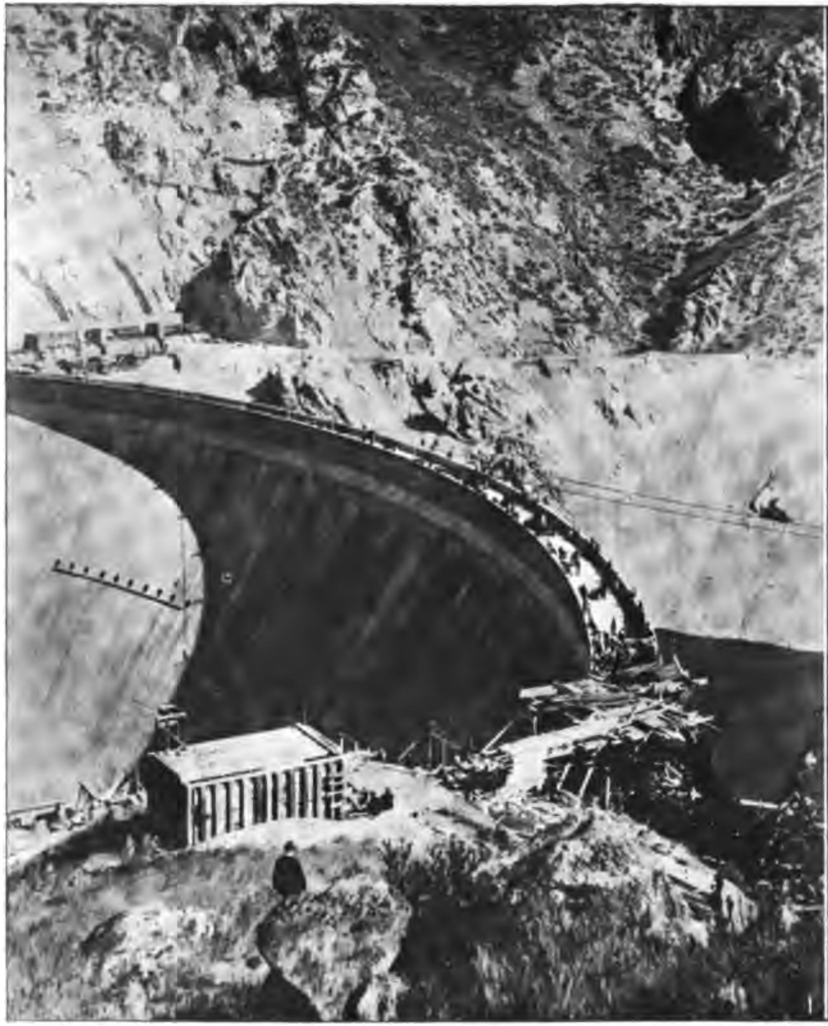
The Columbia Dam across the Susquehanna River is 6,847 feet long and 7½ feet high. It is 16 feet wide at the top and 30 feet at the bottom. It has withstood many severe ice freshets since it was built, in 1875.

The Canyon Ferry Dam (Montana) is 485 feet long and 29 feet high. It is built of timber cribs filled with stone. The downstream face is constructed in two long slopes, the lower one flatter. These slopes take the place of an apron. The up-stream slope is planked and protected by a gravel fill covered with riprap.

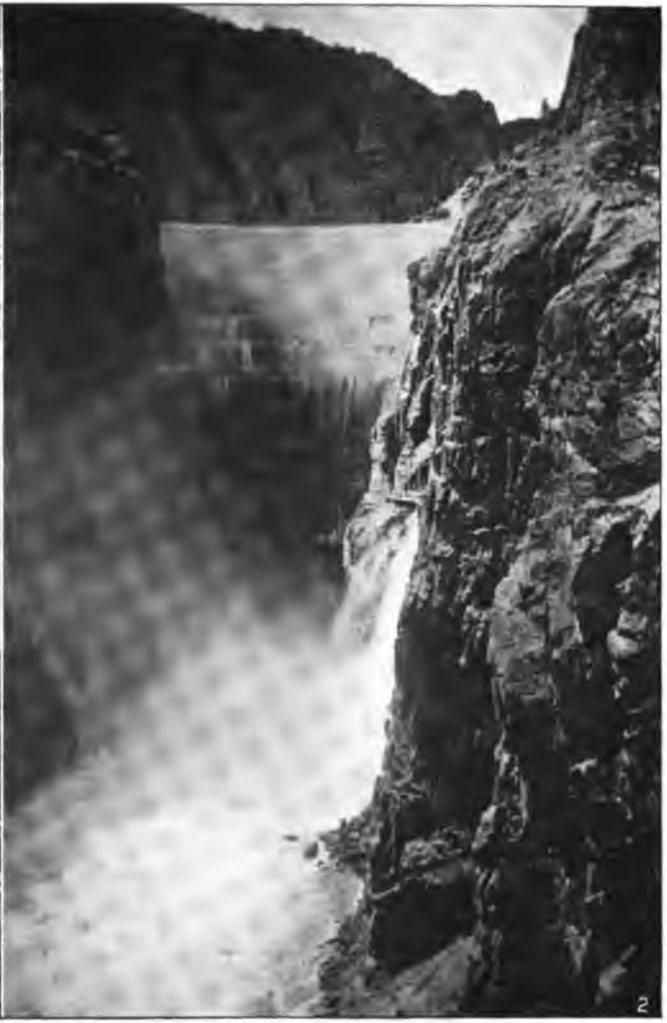
Masonry Dams.— Masonry dams are built after three general types: (1) gravity dams, in which the weight of the material of which the dam is built is depended on to hold back the pressure of the impounded water; (2) arch dams, in which the principle of the arch is opposed to the water pressure; (3) hollow dams, in which the water face of the dam is supported by a series of buttresses. In the third class belong the «multiple arch» dams, in which the small arches are sprung from the buttresses.

The first requisite in masonry dam construction is an exploration of the site. Where there is an earth cover, borings are made to discover

DAMS



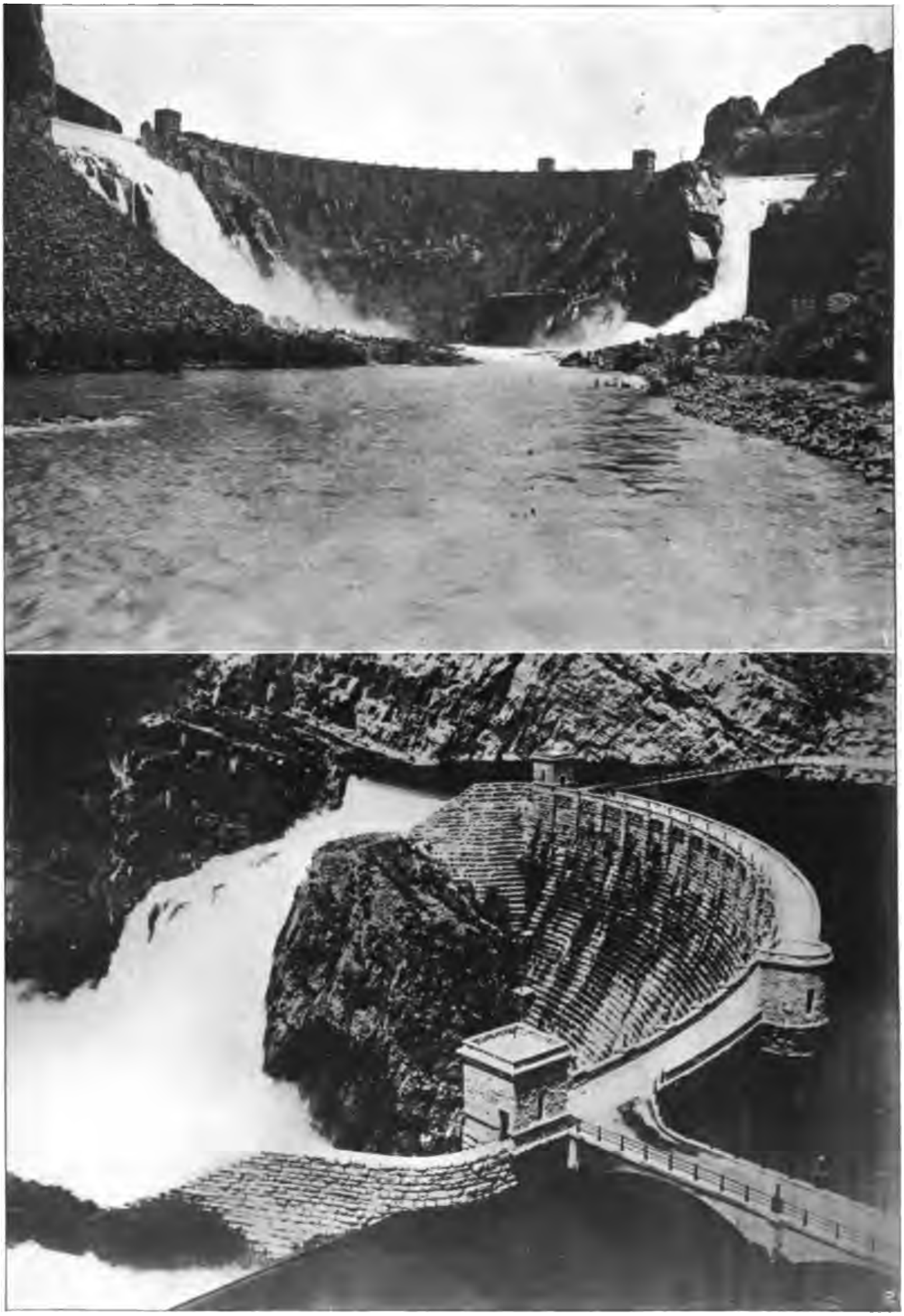
1 Shoshone Dam, Cody, Wyoming, 328 feet high



2 Arrowrock Dam, Boise, Idaho, 351 feet high

Two of the highest dams in the world

DAMS



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Roosevelt Dam across Salt River, Arizona

1 View looking up stream

2 View looking down stream

the location and quality of the necessary rock formation, and exposed rock is searched for existing seams. After diversion works to turn aside the stream while the dam is being built, a trench is dug down to the rock, large enough to accommodate the base of the dam, and room for carrying on the work. The rock surface is cleaned of earth with wire brooms; large seams are filled with concrete, and small seams are grouted under pressure — up to 200 pounds per square inch. Grooves are cut in the rock for the toe of the dam, and if the structure is a high one, additional grooves are cut to ensure against the dam's sliding on its foundation.

The former practice of building the two faces of cut stone and filling between with rubble masonry has been largely superseded by cyclopean masonry, in which great masses of rock are placed by the derrick, and the filling out to the faces done with concrete. With present-day machinery cyclopean masonry can be laid four times as fast as rubble masonry. Another development in dam construction is the reduction of the proportion of stone used in the concrete. Where formerly the stone amounted to 50 per cent of the mass, it is now only about 25 per cent.

Many timber dams have been rebuilt in masonry, including the great dam at Holyoke before referred to. Modern practice in power plants combines a number of turbines on a horizontal shaft connected direct to the electric generator, and this demands that the floor of the fore-bay and of the generator room shall be above the back-water of floods, and that the turbines discharge into the tail-bay through draft-tubes. Recent practice as at Keokuk, Iowa, and the Cedars of the Saint Lawrence, has installed very large single turbine units of the vertical type and has thus much simplified power development. The exacting demands of electrical service require uninterrupted power, or that the head shall be sufficient to give effective results in flood time. These conditions have increased the height of dams to about twice the flood range, with low-water heads of 20 to 40 feet. Some over-fall dams have, however, been carried up to 60 feet.

The approved form for an over-fall dam is a roll-way — a curved crest with a reverse curve extending downstream as an apron to protect the bottom. The crest and upper slant should be worked out as a gravity curve for the maximum flood, thus avoiding the tendency of the nappe to lift, which has been credited as the source of tremor and vibration. The flashboard is a common error, and failure to remove these in floods has caused such vibrations of the confined air as to shake off the tops of dams, in one concrete dam for one-third the height.

A high and well-formed roll-way dam may be called a speed-generator, and in high water the horse power turned into velocity is tremendous; and this is not dissipated by wave action for some distance down-stream. The beds and banks must therefore be defended, and naturally rock sites are sought. These are not always safe, as shown in the failure of the 60-foot dam at Austin, Tex., where the down-stream toe was undermined by reason of the omission of proper defense.

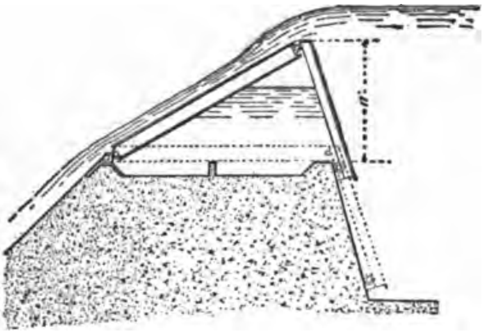
For sites without rock bottom in reach, great care is necessary in defending the channel below from erosion. For such sites the "tumble-bay" dam is best adapted, in which the force of the falling water is dissipated within the confines of the structure. In dams of this type, the sheet of water is given a sheer fall, being well ventilated behind, into the pool or bay which has a depth of one-half to two-thirds the height of the fall, and the water escapes from the bay over a breast wall or roll-way with little or no destructive energy. Some recent designs show an A-shaped plan of dam with a triangular tumble-bay closed by a low roll-way, with a bridge of reinforced concrete spanning the roll-way between piers. The bottom of the bay is a heavy bed of concrete defended by a timber floor beneath the sheet of falling water. The dam on rock across the Mississippi River opposite Keokuk, at the foot of the Des Moines Rapids, for a head of 35 feet is of the roll-way type divided into panels by piers fitted for "stop locks" on the crest.

High dams without rock foundations will, in many situations, require foundations of bearing piles and a liberal use of sheet piling. The structure has naturally a broad base which is an element of security. Further security may be had by sealing the river bed with silt or clay puddle for some distance up stream, depending upon its character and the head. Nature will perform this service in time, if a blow-out does not meantime occur, as streams generally carry sediment at some season.

The problem in such foundations is one of percolation around and beneath. The history of the barrage across the two outlets of the Nile, near the head of the delta, is instructive in this connection. A masonry structure was built upon strata of the most mobile character, and has been put in successful operation by sealing the bed up stream with impermeable material for a distance of 20 times the head on the dam. This experience should assure the practicability of founding a dam on any site.

Movable Dams.— In the improvement and canalization of rivers the dams are usually of moderate height, and when of the ordinary type are called "fixed" dams. The purpose of canalization is to maintain the ordinary pool level as high as the adjacent lands will permit without interfering unduly with the flood regimen, and for this end several types of movable dams have been devised. These are much used abroad and a great development is to be expected in this country. Movable dams are of two general classes: (1) automatic dams, and (2) those operated by external power. In the first group belong the eight types of bear-trap dams: in the second are the bridge dams; shutter and wicket dams; roller dams; frame dams; and curtain dams.

The original of the automatic types is the bear-trap first used on the Lehigh River navigation of Pennsylvania early in the last century. This consisted of a timber platform at or near the level of the stream-bed, with two leaves overlapping. The top leaf was hinged at its up-stream edge to the floor of the dam. The under leaf was similarly hinged at its downstream edge. By introducing water beneath through a regulating sluice these leaves rose with the head of water above until they reached the proper height in the form of a flat Λ dam. The use of these dams for navigation disappeared for a time, but continued in the lumber regions as a device for holding a pool of water for storing logs and then flushing the same down the stream. As thus used the bear-trap has been variously altered and made as long as 60 feet, beyond which trouble has occurred from the warping or twisting of the leaves. Various designs have been proposed for waterway purposes. The most notable application is the so-called «Chicago» bear-trap, 160 feet long, installed at Lockport, Ill., as a part of the «controlling works» of the Chicago Drainage Canal. This is made of metal, is hinged at the top angle, the upper-leaf dropping in front of a breast-wall. It has a range of 15 feet and is so counter-weighted and controlled that the depth flowing over is practically uniform at any elevation, and it is easily manœuvered by one man. The other modifications of the bear-trap are the DuBois dam, in which the two leaves are hinged at the apex, and the downstream leaf hinged to the foundation, the upstream leaf sliding; the Carro dam, in which the leaves are hinged at the apex, and both slide in links on the foundation; the Girard dam, in which the leaves are hinged at the apex, and the downstream leaf in two parts hinged at its middle, folding up stream; the Parker dam, in which the leaves are hinged at the apex, and the upstream leaf in two sections, hinged at its middle, and protected by an idler leaf sliding on the foundation; the Lang dam, claimed to be an improvement on the Parker, in which the upper part of the latter's upstream leaf is omitted, and the lower part hinged to the idler; and the Marshall dam, in which the hinge joining the leaves is near the middle of the water leaf, on its downstream side, and the downstream leaf is in two parts, hinged at the middle, forming a salient angle pointing down stream; the upstream part of the downstream leaf is constantly horizontal, and its lower part is parallel with the water leaf, forming an exceedingly flexible dam, managed entirely without chains or stops.



Bear-trap Dam. Water-power Plant, Chicago Drainage Canal, Lockport, Ill.

Bridge dams consist of a permanent bridge with the openings between the piers closed by some form of gates supported directly by the piers. The type is an evolution from the old «stop-plank» used in mill practice, set vertically or horizontally. If vertically it is called a needle dam. The «needle» is a piece of light wood, rectangular, and shaped into a handle at top. These are placed in juxtaposition against a sill on the floor of the pass or on the weir and against a girder above water level. The needles are usually designed for one man to handle, and their application is thus limited to needles 4¼ inches square, and about 16 feet long, weighing about 100 pounds. It is properly an auxiliary in some other type of movable dam for the purpose of regulating pool level in moderate flows of water. A needle dam has been built, however, on the Big Sandy River in which the needles are 12 inches square and 18 feet long, and weigh 863 pounds. They are handled by a derrick mounted on a boat.

The shutter or wicket dam is thus far the favorite for river work. This consists of shutters several feet in width and of the length desired set side by side, the lower edge resting against a sill and supported by a prop behind, the shutter tipping automatically and falling to the river-bed when the depth over top exceeds a certain limit. The shutters are raised by means of a windlass from a service bridge or boat. This type of dam is used on the Ohio and Great Kanawha rivers. The dams on the Ohio River improvement are mostly of Chanoine wickets in their navigable passes, with pool regulating weirs of bear-trap type. The length of these wickets varies from 9 feet 9 inches for the lowest weirs to 18 feet for the highest passes. The wickets are 3 feet 9 inches in width, set with 3-inch openings between which they are closed by pieces of scantling in time of low water. The vertical height of the bear-trap dams varies from 9 feet to 15 feet. The usual width of the navigable passes is 600 to 700 feet, and of the bear-trap dams 91 to 94 feet, with extremes of 52 feet and 120 feet.

Roller dams are formed by a massive cylinder having a diameter equal to the desired height. Opening the dam is accomplished by rolling the cylinder bodily up inclined tracks laid at both ends of the dam. In a roller dam recently built at Schweinfurth, Germany, the cylinder is 13 feet 6 inches in diameter, and closes an opening 59 feet across.

Frame dams are essentially bridge dams, in which the bridge itself is movable. In its simplest form it consists of a series of A-shaped frames set closely side by side. These are arranged to drop down sideways nesting one in another. They are raised by a chain connecting the peaks of the A-frames.

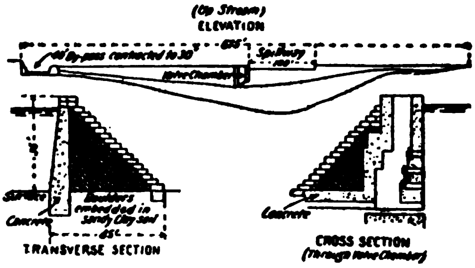
Curtain dams have an operating bridge with a series of frames hinged to the bridge at the top. These can be lowered till the other end abuts against a stop on the dam floor. The actual closure is effected by curtains of horizontal bars of wood hinged together on their upstream side, the lower bars being heavier. A rolling «shoe» of iron is attached to the lowest bar, and an endless chain passes around the curtain at its centre. The curtain is rolled up by a windlass operating the chain. At the Port Villez Dam across the Seine 90 miles below Paris is the original curtain dam, 700 feet long and 10 feet 6 inches high.

The Taintor gate has been much used for closing passes and chutes and has been built in sections 20 feet long and for a depth of 10 to 12 feet. This is a sector of a cylinder against the water, the centre of motion and support being below the centre of figure, so that the water pressure shall nearly balance the weight and assist in raising the gate. Some dams have been built for power purposes in which the flood flow is practically controlled by Taintor gates.

The reverse Taintor or rigid bear-trap is a sector of a cylinder in the form of an inverted trough, having one side straight, and the other curved to the radius of the straight side. The free edge of the straight side is hinged to the dam floor, so that the whole structure can revolve, sinking into a well in the floor. The curved side and ends of the "trough" make an approximately watertight contact with the masonry. Water from above the dam can be admitted to the under side of the sector, raising it until the water pressure balances the weight of the gate. The river flows over the crest, and down the straight side. This type is in use at the power plant of the sanitary district of Chicago and is under construction in the Genesee River at Rochester, N. Y.

Under this classification belongs also the butterfly dam in the Chicago Drainage Canal, the only structure of its kind. The swinging leaf is 184 feet long and 30 feet high, and weighs 710 tons. It consists of a girder faced with steel plates on the upstream side. It is pivoted at the centre, and so as to swing into the line of the flowing stream when open. The maximum pressure against the bottom pivot when the dam is closed is 1,888 tons; on the top pivot 870 tons. The dam is opened by releasing the lockbar blocking the downstream end, and then opening several shutters in the end that swings up stream: the pressure thus reduced on that end, the pressure on the other end swings the dam open — with some mechanical aid.

Rock-fill Dams.— Hydraulic mining on the Pacific slope developed the rock-fill dam, and it has been utilized for irrigation works. Originally this dam consisted of a dump of loose rock in a canyon or other rock-bound site, taking its natural slope down stream, the upper slope being hand-laid and steeper and faced with redwood or other planking and calked. Later a sheet of metal was substituted for the planking, and the construction was varied by setting the metal sheet vertically in the heart of the dam. The metal sheet was coated and sometimes enclosed in asphaltum concrete. Such dams had an independent spillway.



Castlewood Rock-fill Dam, Denver Land and Water Co.

These dams have been carried to considerable heights, several exceeding 100 feet, the highest being the Lower Ottay, near San Diego, Cal., 161 feet above rock and 130 feet above natural surface. It is 565 feet long, 20 feet wide at the top and 282 feet at the base. Settlement has occurred in most of these dams, causing apprehension, but no serious disaster has occurred.

A dam of this character was undertaken in Goose-neck canyon on the south fork of the South Platte, some 50 miles southwesterly from Denver. In order to avoid settlement, the rock was dropped into place from a height of about 100 feet, as experience in the spoil-banks of the Chicago Drainage Canal had shown such consolidation from this cause that blasting was resorted to in opening up a roadway across such a fill. The downstream slope was to be flattened and the hand-laid stone up stream was to be filled with lean concrete, and faced with a metal sheet. When this dam had reached a height of 50 to 60 feet it was overtopped by an unprecedented flood and washed away. The experiment was valuable in showing that a mound of granite rock thus consolidated was nearly watertight, under a head of 50 feet of water. (The facing was not carried up). This experience suggested that a filling of finer material gradating to adobe at the face would have made a successful structure without the intervention of wall or metal sheet. The site was later occupied by a high masonry dam.

The Castlewood Dam (Colorado) is a rock-fill dam 600 feet long and 92 feet high. It is 8 feet wide at the crest, and 225 feet at the base, and has a facing of rubble laid in cement on both slopes.

The Pecos Valley Dam is a rock-fill, 1,686 feet long and 52 feet high. It is 14 feet wide at the top and 115 feet at the bottom, with an earth backing for 162 feet on the water slope. The earth fill is faced with riprap one foot thick.

The Morena Dam (California) is 520 feet long, with a maximum height of 267 feet. The water slope is 9 horizontal to 10 vertical, of masonry behind which was placed loose rock by hand 54 feet wide at the base and 16 feet at the crest. The loose rock-fill was dumped behind this, forming a total base of 357 feet. The water face was finished with reinforced concrete slabs 12 inches thick.

Experience in this class of construction also suggests the flatter slope down stream and the water-tight skin at the upper face, rather than a core or intercept in the heart of the dam. Dams which depend on a timber or metal sheet for tightness cannot be regarded as permanent structures, and a lack of care in maintenance invites destruction. They are, however, useful expedients in the early development of remote regions.

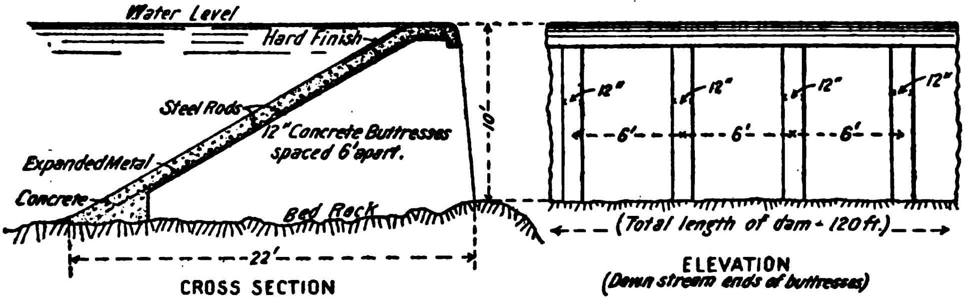
Metal Dams.— Metal dams are often proposed, and a few examples have been executed in steel. Steel is perhaps more perishable than timber, and its failure from growing weakness and lack of care is likely to be more complete and disastrous. It is adapted to much greater heights, but is to be regarded as an expedient for a few years until something better is justified.

Prominent examples of the steel dam are:

The Ash Fork Dam (Arizona), 184 feet long and 46 feet high. It is of open front design, the deck being supported on 24 triangular bents set 8 feet between centres on a concrete foundation. The water face is of steel plates which are riveted to 20-inch I-beams which form the upstream members of the bents. The deck plates are ⅜ of an inch thick, and are curved to a radius of 7½ feet (laterally), the concave side being up stream. The deck makes an angle of 45 degrees with the horizontal.

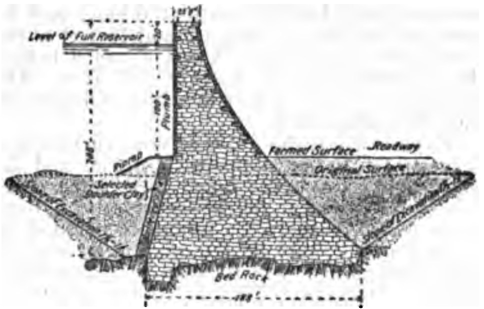
The Redridge Dam (Michigan) is of the same general construction as the Ash Fork Dam. It is 464 feet long and 74 feet high. The face members of the bents vary from 15-inch I-beams on the low bents to 24-inch I-beams on the high ones.

The illustration shows a combination of steel bents with a reinforced concrete deck, in a small dam erected at Theresa, N. Y.



Concrete-steel Dam, Theresa, N. Y.

High Masonry Dams.— The high masonry dam is comparatively recent, originating in Spain some three centuries ago, but its rational design began with the Furens Dam in France less than a half century ago. The examples are not yet numerous, but the better quality of masonry for hydraulic construction and the greatly reduced cost, together with the more enlightened demand for the conservation of water for irrigation, water supply, water power, navigation and fisheries, combined with the greater security and permanence, promises an era of high masonry dams.



Cross-section through the Wachusett Dam at the deepest part of the valley. Metropolitan Water Supply, Boston, Mass.

The approved cross-section has a thickness at top of 8 to 10 per cent of the height, a curved batter down stream and a slightly curved batter up stream, the conditions being that the locus of strain shall not pass outside the middle third, and that the greatest pressure in the masonry shall not exceed safe working limits, the latter being governed by the quality of the masonry. The construction is massive random rubble work with an avoidance of continuous beds and joints, the upstream face in courses with roughly dressed beds and joints, the downstream face of selected stone. The top of the dam is usually finished as a roadway with parapet walls, and the spillway is constructed on an independent location. The site is a rock gorge or canyon with a valley expanse above for the reservoir.

Among the notable masonry dams of the gravity type may be instanced the following:

The Assouan Dam, across the Nile, in Egypt, is the largest masonry dam in the world. It is built of granite rubble, is 6,400 feet long, and has a maximum height of 112 feet. Its mass contains 1,179,000 cubic yards of solid masonry.

The New Croton Dam (built 1892–1906), a part of the water supply works of New York city has a length of 1,168 feet, with a spillway of 1,000 feet connecting at right angles. The maximum height of the dam is 297 feet, and the head of water 136 feet. The dam is part rubble and part cyclopean masonry, and has a mass of 855,000 cubic yards — by far the largest in America and second only to the great Assouan Dam on the Nile. (See diagram on another page).

The Ashokan, or Olive Bridge Dam (New York city water supply), across the Esopus Creek, is 1,000 feet long, with continuing core walls and embankment — 4,800 feet in all. Its maximum height is 251 feet. It is of cyclopean masonry faced with concrete blocks. The masonry mass has a content of 488,200 cubic yards.

The Tansa Dam, in India (water supply of Bombay), is of rubble masonry, 8,800 feet long and 118 feet high, with a mass of 408,500 cubic yards.

The Waldeck Dam across the river Eder, in Germany, is of rubble masonry. It is 900 feet long, 160 feet high and has a content of 392,400 cubic yards.

The Poona Dam, in India, is of rubble masonry, 5,136 feet long and 108 feet high, with a mass of 362,000 cubic yards.

The Roosevelt Dam, in Arizona (built 1905–11), is of rubble masonry with concrete in vertical joints. It is 680 feet long and 260 feet high. It is 158 feet wide at the base and 16 feet at the top. Its content is 344,000 cubic yards.

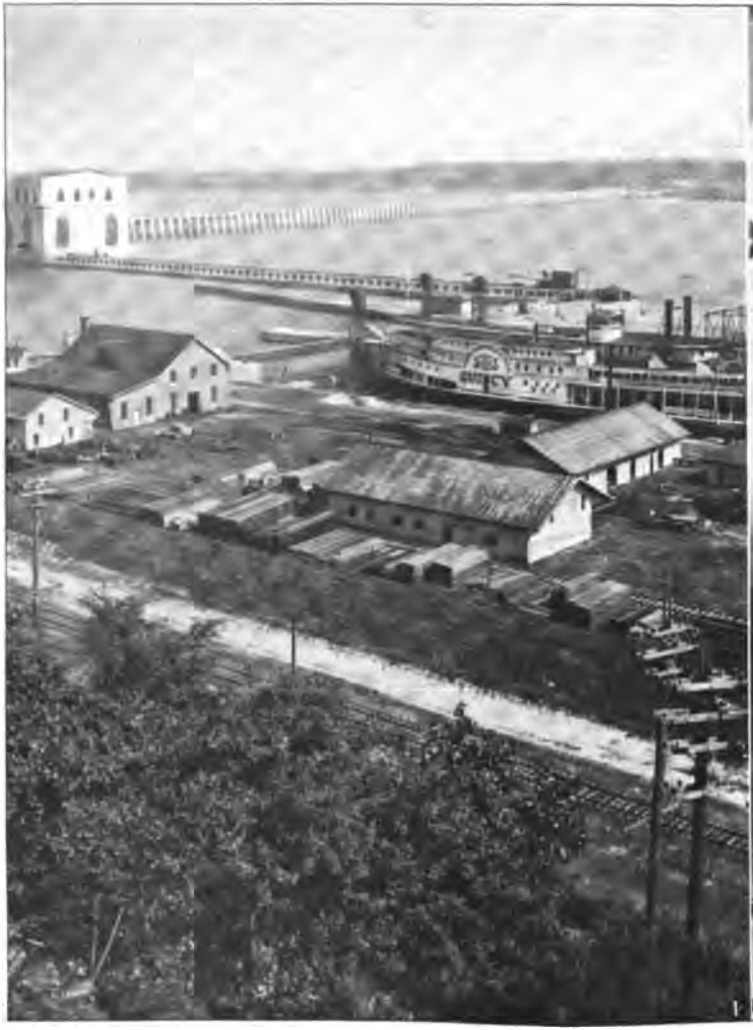
The Mauer Dam, in Germany (built 1904–12), is of rubble masonry, 918 feet long and 208 feet high. It has a mass of 332,000 cubic yards.

The Lake Cheesman Dam, of the Denver water supply, is one of the very high masonry dams carrying a free head of water second only to the Arrowrock Dam. It is 700 feet long on the crest, with a maximum height of 225 feet. It is built on a curve, the radius of which is 400 feet. It is of granite rubble, with a mass of 103,000 cubic yards.

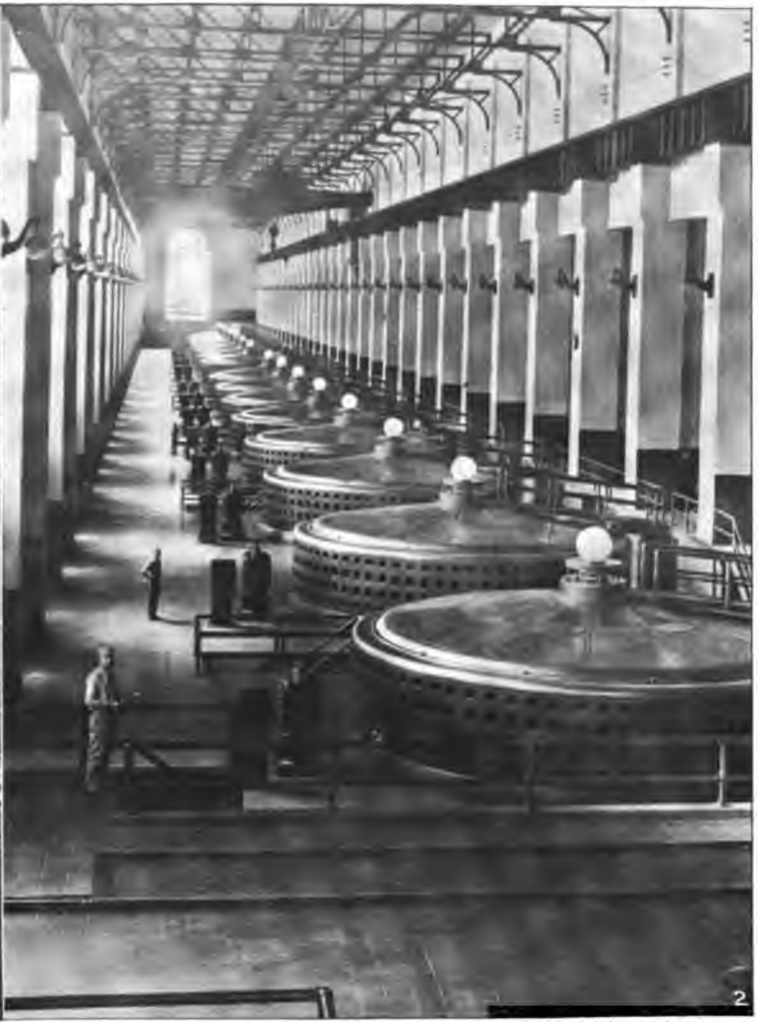
Of all-concrete dams of the gravity type, the following are examples:

The Arrowrock Dam, over the Boise River, in Idaho (built 1912–16), is of concrete with

DAMS



1 Keokuk Dam, 4,278 feet long, across the Mississippi river from Keokuk, Iowa, to Hamilton, Illinois



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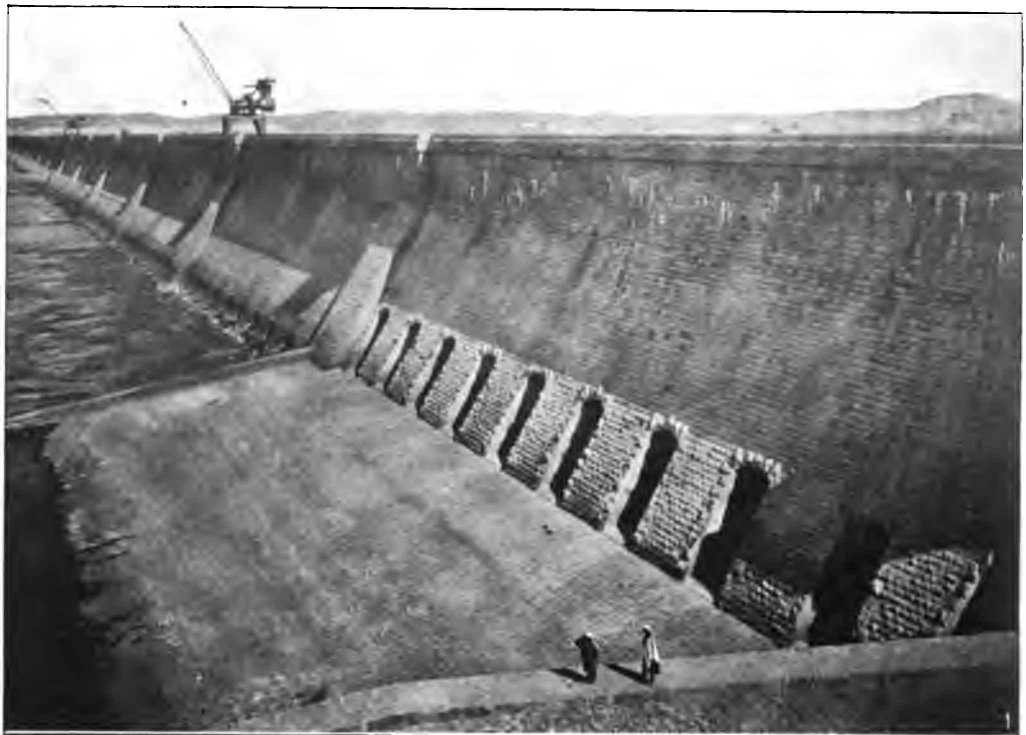
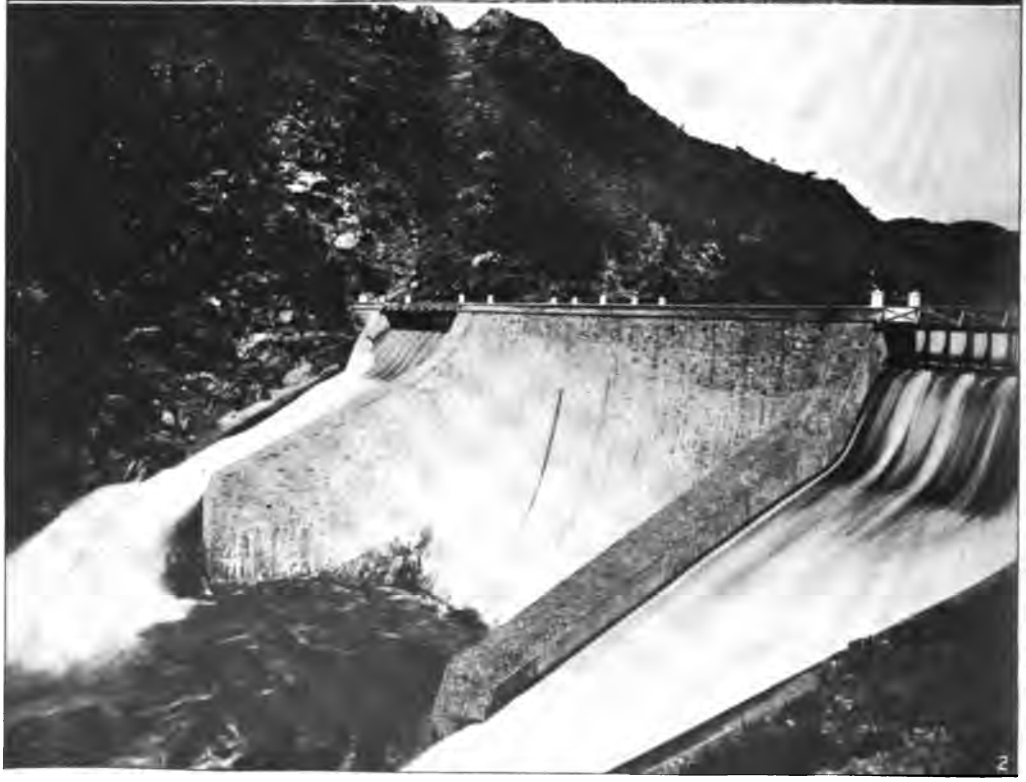
2 The 15 big generators turned by power from the Keokuk Dam

DAMS





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1 Assouan Dam, Egypt, looking down stream **2 San Roque Dam, Providence, Arizona**

as many «plums» distributed through its mass as could be conveniently placed. It is 1,160 feet long, with a maximum height of 351 feet — the highest dam in the world at the time of its completion. It is built on a curve of 662 feet radius, though of gravity type, being 238 feet wide at the base, and 15½ feet at the crest. Its content is 530,000 cubic yards. The free head of water behind the dam is 248 feet — 31 feet higher than at the Lake Cheesman Dam, which formerly held the record in this respect.

The Elephant Butte Dam, across the Rio Grande in New Mexico, is of cyclopean concrete carried up in huge block sections. It is 1,310 feet long and 305 feet high, with a cubical content amounting to 608,000 cubic yards, making it the third largest masonry dam in the world, surpassed in bulk only by the Assouan Dam in Egypt and the New Croton Dam in New York.

The Keokuk Dam on the Mississippi is a massive concrete monolith, 4,649 feet long and 53 feet high. It is 29 feet wide at the top and 42 feet at the bottom. The spillway section is 4,278 feet in length and a height of 36 feet, allowing for a head of 11 feet over the crest. The deck of the dam above the spillway is supported on 119 arches, 36 feet from centre to centre, on 6-foot piers. From this deck are operated the steel gates (11 feet by 32 feet) which close the spillway openings. In building this dam concrete was poured 40 feet deep per day — a 15-foot lift, then 5 hours for setting, followed by the 25-foot lift.

The Barcelona (Spain) Dam, completed in 1916, the largest dam in Europe, is of concrete and was built by American engineers. Its maximum height is 330 feet and its length on the crest is 700 feet. The thickness at the base is 230 feet and at the crest 14 feet. The dam holds an artificial lake 15½ miles long and 3¾ miles wide, designed to irrigate 100 square miles of arid country and also furnish 20,000 electric horse power, later to be increased to 40,000 horse power.

Notable examples of the arch type of dam are the following:

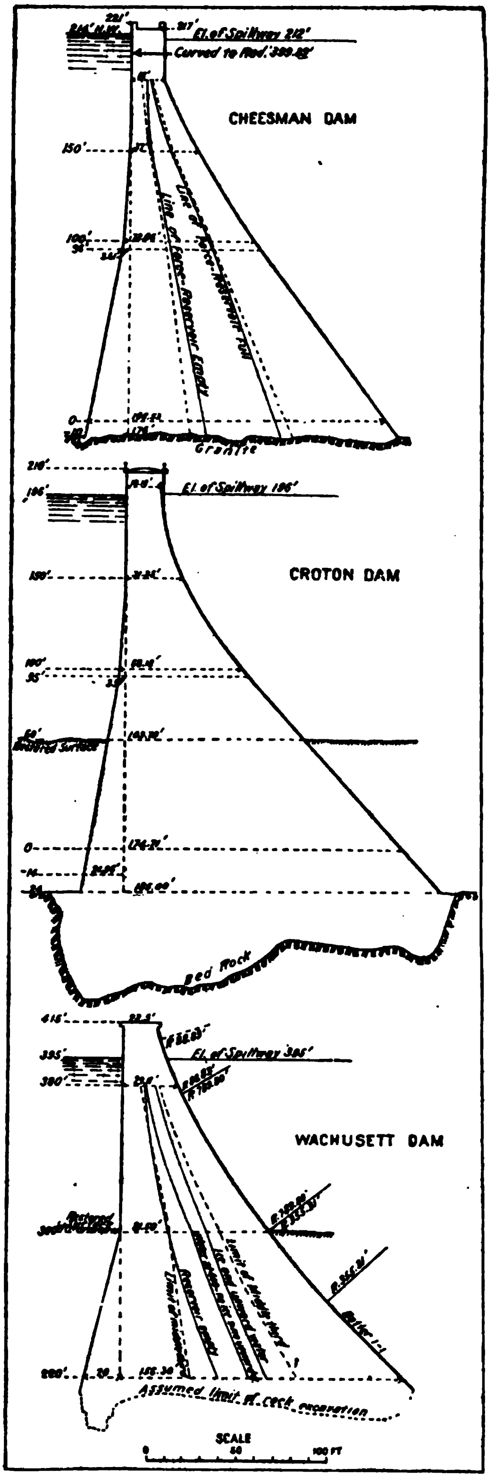
The old Bear Valley Dam (built in 1884) surpassed in boldness of design all dams previously built. It was of granite ashlar faces with rubble filling, set in Portland cement. It was 450 feet long and arched to a radius of 335 feet. Its maximum height was 64 feet and it was 20 feet thick at the base and 3.2 feet at the crest. Notwithstanding the severe criticism it received, it stood unimpaired until submerged in 1915 behind the new dam.

Barossa Dam, in Australia (built 1899–1903), is of cyclopean masonry. It has a maximum height of 113 feet and is 42 feet thick at the base and 4½ feet at the crest.

An arch dam of remarkable design was recently built across Crowley Creek, in Oregon. It is of gravel concrete, without reinforcement, 170 feet long with a maximum height of 65 feet. It is 5.2 feet thick at the base and 3 feet at the crest. For the upper 30 feet the faces are parallel, the slight batter being below that section on the downstream side.

The Shoshone and Pathfinder dams, in Wyoming, depend in part upon their arch form for stability.

Shoshone Dam (built 1905–10) is of rubble masonry, arched to a radius of 150 feet. It is 200 feet long, with a maximum height of 328 feet. It is 108 feet thick at the base and 10 feet at the crest.



Comparative Sections —High Masonry Dams.

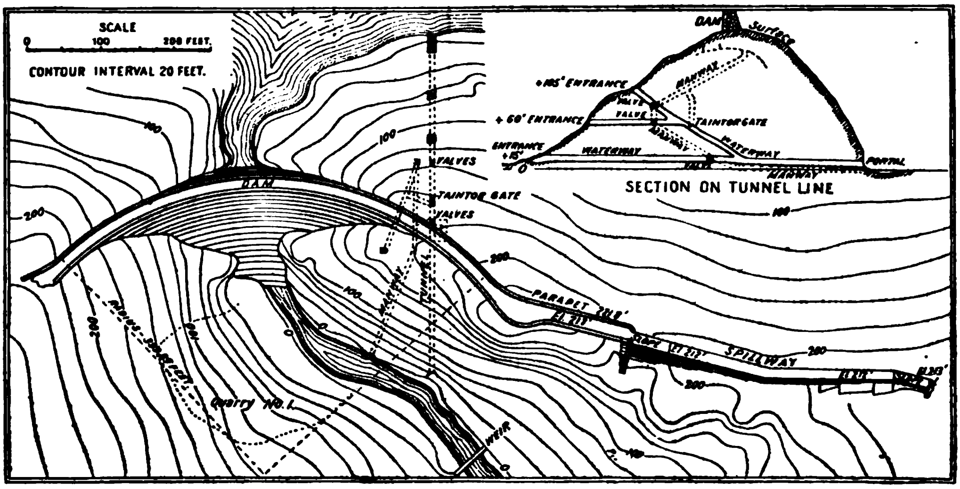
Pathfinder Dam, across the North Platte

River (built 1906–10), is of masonry, arched to a radius of 150 feet. It has a maximum height of 210 feet and is 94 feet thick at the base and 11 feet at the crest.

Among the more recent hollow dams are:

Douglas or La Prele Dam, in Wyoming (built 1908–09), an open front dam of the Ambursen type, 360 feet long and 135 feet maximum height. The deck is at an angle of 40 degrees with the horizontal and is 12 inches thick at the top and 54 inches at the bottom. The supporting buttresses are 18 feet between centres, 12 inches thick at the top and 50 inches at the bottom, 10 feet deep at the crest and 160 feet at the base. The material is reinforced concrete. The whole batter is on the water face.

Jordan River Dam, on Vancouver's Island, is of reinforced concrete, 756 feet long and 126 feet high. The buttresses are 7½ feet deep at the crest and 148 feet at the base. They are placed 18 feet between centres and are 12 inches thick at the top and 42 inches at the bottom. The deck (cast after the buttresses were built) is 15 inches thick at the top and 55 inches at the bottom.



Lake Cheesman Dam. Water Supply of Denver, Colorado.

The Three Miles Falls Dam, in Oregon (built 1914), is a multiple-arch dam, curved to a radius of 1,200 feet, and 24 feet in height. It is composed of 40 arches sprung from the buttresses as piers with a radius of 18 feet. The buttresses are placed 20 feet from centre to centre, 2 feet wide at the crest and 34 feet at the base. They are 12 inches thick at the top and 24 inches at the bottom.

The Big Bear Valley Dam, in California (built 1914–16), is 363 feet long and 92 feet high. It is a multiple-arch dam, consisting of 10 arches of 30½ feet chord, sprung from buttresses 22 feet deep at the crest and 111 feet at the base. The buttresses are 18 inches thick at the top and 54 inches at the bottom.

The Mathis Dam, at Tallulah Falls, Ga., is 650 feet long and 90 feet high, of reinforced concrete. The deck is 18 inches thick at the top and 39 inches at the bottom, and is supported by buttresses 16 feet deep at the crest and 148 feet at the base. The buttresses are 16 inches thick at the top and 31 inches at the bottom. A rock foundation not being available, the buttresses were built on a thick mattress of concrete.

Adjuncts.— The ordinary dam across a stream is its own spillway. For impounding dams of earth or rock-fill the necessity for independent spillway is obvious. It should be equally obvious for the high masonry dam, and this is now recognized by the best practice. Many errors have been made, especially in arid regions, through insufficient spillway. In humid regions the "greatest flood" occurs two or three times in a century, and if these are provided for, the margin is usually sufficient for any contingency. In the arid regions a flood as great may be possible, but the occurrence is far more erratic. Cloudbursts produce startling effects in small basins, but the results in basins of considerable area are not significant.

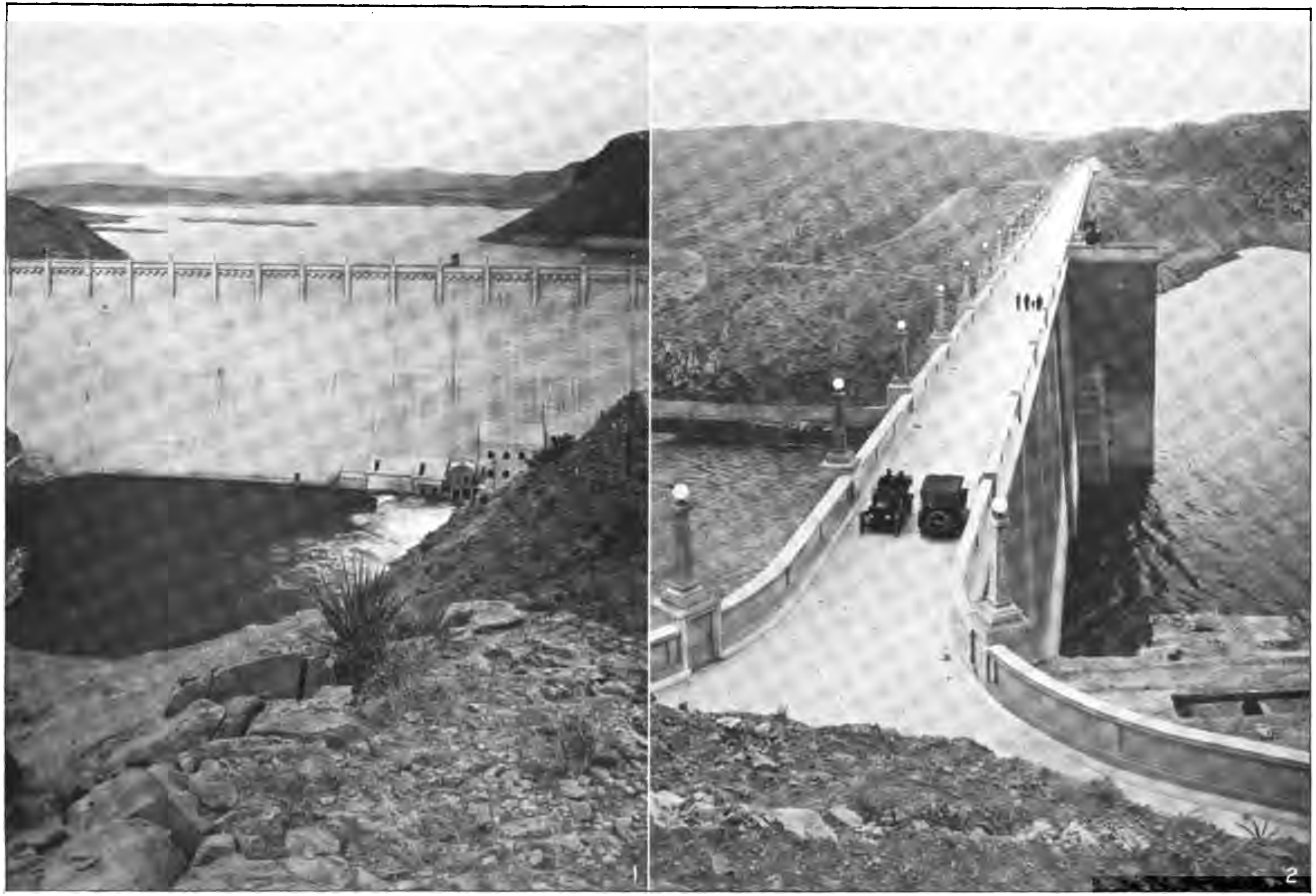
The Yellow River of China has a large proportion of arid and semi-arid territory, and five times in its history it has devastated its valley, notwithstanding all the defenses of man, and changed its lower course to the sea. All the factors in flood flow will sometime conjoin, and a work that is to last through the centuries must recognize all the possibilities.

Adjuncts in the way of gates, sluices and movable structures are much favored by some designers, especially where they serve to lessen cost. Such provisions should not be carried to a point where their failure to operate or be operated will produce damages amounting to a disaster.

The location of service pipes and outlets through or beneath dams is shown by experience to be a source of danger, and the best practice now seeks an independent location.

The tendency is now to avoid the long race for power purposes, to build the dam at the foot rather than the head of the rapids or descent, and to make the power station and forebays a part of the structure, taking the water directly from the pool.

Outside of the main elements of a structure on which safety and permanency depend, many devices and constructions are permissible, as



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Two views of Elephant Butte Dam across the Rio Grande River, New Mexico

failure in these results in only temporary loss and inconvenience.

General Remarks.— Dam building is still in the evolutionary stage, and the resources of engineering therefor are still developing. Modern practice includes the construction in the body of the dam of a more or less complete drainage system to collect any water leaking in from the reservoir. In the Kensico Dam there are also thermophones to give warning of unusual changes of temperature. The Wachusett Dam (diagrams on another page) was the first in which ice pressure was taken into account in calculating the cross-section. The engineers estimated it at 47,000 pounds per lineal foot for ice 12 inches thick at full reservoir. In the Arrowrock Dam there is a system of inspection galleries, of which the control chambers form a part. These give access to the body of the dam at several elevations, the lowest being 230 feet below normal high water in the reservoir.

So far as general designs are concerned, the type structures would seem to be well defined, but every site has its own peculiar conditions, requiring elasticity in treatment, and financial limitations often blight the proper solution. A dam when once built assimilates so closely to natural resources, is so fully identified with the public welfare, and the failure is so disastrous, that its construction becomes a matter of solicitude above that of any other engineering work. Of 28 failures of dams investigated, 12 were found to be due to faulty construction, although the dimensions were correct; 11 were due to insufficient spillway — these were mainly earthen dams, and high water overtopped them; 4 were due to faulty foundation and 1 to percolation along pipe-lines. See Irrigation; Reservoir; Water-works; Water Power.

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Richard Ferris.

DAMSEL-FLY, sometimes, though rarely, used as a popular name for the common dragonfly, or mosquito-hawk, of the neuropterous family *Libellulidæ* or *Odonata*. Damsel-fly is the English equivalent for the French *demoiselle* (fly) which is applied only to the genus *Agrion* and its immediate allies. This is a very small dragon-fly, not half as large as *Libellula*. Its metallic greenish-blue color and slender delicate form produce a beautiful effect in the sunshine and suggest the name. See Dragon-fly.

DAMSON, a variety of plum (q.v.).

DAN (Heb. «judgment»), one of the sons of Jacob by his concubine, Bilhah. Like the other sons of Jacob, Dan became head of one of the 12 tribes of Israel. At the time of the exodus the Danites numbered 62,700 adult males. The territory assigned them in Canaan lay on the coast, but living in the immediate neighborhood of the hardy and well-equipped Philistines — for the district lay partly within the Philistine territory — the available land proved somewhat too narrow for the Danites, and they were pushed back into the more mountainous region, where they encroached on the boundaries of Judah. The tribe also possessed an isolated portion of territory in the extreme north of Canaan, containing the town of Laish or Dan, which gave rise to the proverbial expression «from Dan to Beersheba.» This town was in later times selected by Jeroboam as one of the two centres of his idolatrous worship, but a species of idolatry had been maintained there from the earliest times of the settlement in connection with the image of Micah. The most notable person connected with the tribe was Samson. Consult Schmidt, N., ‹The Messages of the Poets› (1911).

DAN RIVER, river rising in the Blue Ridge Mountains in Patrick County, Va. It flows south into North Carolina and recrosses the boundary four times; it next joins the Staunton River in Virginia to form the Roanoke River. It is about 175 miles long and drains an area of 3,500 square miles. The United States government has made the channel navigable for boats of light draught as far as Madison.

DANA, Charles Anderson, American journalist: b. Hinsdale, N. H., 8 Aug. 1819; d. Glen Cove, L. I., 17 Oct. 1897. He was educated at Harvard and in 1842 was a member of the Brook Farm Community, in Roxbury, Mass., remaining there only two years. He edited *The Harbinger* (1844–47), his associates being George Ripley, Parke Godwin and John S. Dwight. In 1847 he became managing editor of the New York *Tribune,* with which he remained until 1861. In 1855, with George Ripley, he projected and edited Appleton's ‹American Encyclopædia› in 16 volumes, completed in 1863, and revised in 1873–77. He also edited several other works, among them the popular ‹Household Book of Poetry› (1857); ‹Life of Grant› (1868); ‹Art of Newspaper Making› (1895); ‹Lincoln and His Cabinet› (1896); ‹Recollections› (1897). From 1862 to 1865 he was in the service of the United States government, during the last two years as assistant Secretary of War under President Lincoln. About the beginning of 1866 he became editor of the Chicago *Republican,* a daily paper. In 1868 he purchased an interest in the New York *Sun,* also a daily, of which he was editor and chief proprietor until his death. He was a man of forcible character and impressed his personality upon his paper. His literary judgments and perceptions were keen and his own writing exhibited a perfect mastery of English style. Under his management the *Sun* became noted for the literary quality of its editorials. In his later years, however, his intense political partisanship became very marked and greatly diminished the weight of his influence in journalism.

DANA, Charles Loomis, American physician: b. Woodstock, Vt., 25 March 1852. He was educated at Dartmouth and at the New York College of Physicians and Surgeons. He served as professor of physiology in the New York Woman's Medical College in 1880–86, of nervous and mental diseases at the New York Postgraduate Medical School in 1884–96, and of nervous diseases in Dartmouth Medical College in 1890–93, and four years later he became professor of nervous diseases in Bellevue Hospital Medical College. He was also an editor of the *Journal of Comparative Medicine* and associate editor of the *Medical Record*. He is author of a 'Text-Book of Nervous Diseases' (1892; 7th ed., 1908), and many monographs on nervous and mental diseases.

DANA, Edward Salisbury, American mineralogist: b. New Haven, Conn., 16 Nov. 1849. He was graduated from Yale in 1870 and has been a member of the faculty at that institution from 1874, since 1890 has been professor of physics. He received the degree of D.Ph. at Yale in 1876, and spent some time at the universities of Heidelberg and Vienna. After 1875 he edited the *American Journal of Science*. He is a member of the National Academy of Science. He has published 'A Text Book of Mineralogy' (1877); 'Text Book of Mechanics' (1881); 'Minerals, and How to Study Them' (1895); 'Sixth Edition of James D. Dana's System of Mineralogy' (1892); also many papers on mineral and other scientific subjects.

DANA, Francis, American jurist and diplomat: b. Charlestown, Mass., 13 June 1743; d. 25 April 1811. He was a son of Richard Dana (q.v.), was graduated at Harvard in 1762, and admitted to the bar in 1767. In 1775 he was sent to Europe on a confidential mission to Benjamin Franklin, carrying letters from Warren, Quincy and other patriots. He returned the next year and reported to General Washington that the colonies need expect nothing of Great Britain. In 1777 he was elected a member of the Congress that formed the Confederation, and filled various offices during the Revolutionary War. In 1781 he was made Minister to Russia, and after his return was again elected to Congress. In November 1791 he was appointed chief justice of Massachusetts for a term of 15 years. He was one of the founders of the American Academy of Arts and Sciences.

DANA, Francis, American lawyer and author: b. Singapore, East India, 4 March 1866. He was educated at Saint Paul's School, Concord, N. H., and the Harvard Law School, and engaged in active law practice in New York city. Besides contributing short stories to periodicals has published 'Leonora of the Yawmish'; 'The Decoy,' etc.

DANA, James Dwight, American mineralogist: b. Utica, N. Y., 12 Feb. 1813; d. New Haven, Conn., 14 April 1895. He showed an interest in science from his early youth, and this was encouraged by Fay Edgerton, his teacher in the Utica High School. In 1830 he matriculated at Yale, where he studied under the elder Benjamin Silliman, whose reputation had attracted him. After devoting three years to the study of mathematics, the classics and natural science, he received an appointment as instructor in mathematics to midshipmen in the United States navy, and cruised in the Mediterranean while engaged on this duty. From 1836 to 1838 he assisted Professor Silliman in his chemical laboratory at Yale, and there wrote his first important work, 'The System of Mineralogy.' From 1838 to 1842 he acted as mineralogist and geologist to the United States exploring expeditions sent out under Capt. Charles Wilkes to investigate the Pacific Ocean and its natural history. During the next 13 years, he worked up the material which he had collected during this expedition into many scientific articles. This labor ruined his health. In 1844 he returned to New Haven, where he married the daughter of Professor Silliman. When the latter resigned in 1850, Dwight was appointed Silliman professor of natural history and geology at Yale, and held this chair till 1892, when he retired. In 1846 he became joint editor with Professor Silliman of the *American Journal of Science and Arts*, and after the death of his teacher he became the chief editor. Dana had a keen, analytic, imaginative mind. His speculations concerning the formations of continents, mountains, volcanoes and other major features of the earth's crust still possess the utmost value. He was a member of many of the great learned societies of the world; and was president of the American Association for the Advancement of Science in 1854; and of the Geological Society of America in 1890. He received the Wollaston medal of The Geological Society of London in 1874 and the Copley medal of the Royal Society of London in 1877. He published 214 books and papers. Of these the most important are those which record the results of the Wilkes expedition as to geology, zoophytes (with 230 new species), and crustacea (with 658 new species), and his 'System of Mineralogy' (1837, with many later editions); 'Manual of Geology' (1862; 4th ed., 1895); 'Manual of Mineralogy' (1848); later 'Manual of Mineralogy and Lithology' (4th ed., 1887); 'Corals and Coral Islands' (1872; 2d ed., 1890); 'Characteristics of Volcanoes' (1890). Consult Gilman, D. C., 'Life of J. D. Dana' (1899).

DANA, John Cotton, American librarian: b. Woodstock, Vt., 19 Aug. 1856. He was graduated at Dartmouth College 1878, and admitted to New York bar 1882. He was librarian of the Public Library, Denver, Colo., 1889–97; of the City Library Association of Springfield, Mass., 1898–1901, and has since been at the head of the Public Library of Newark, N. J. He is secretary and director of the Newark Museum Association which has its home in the public library building and is largely the outcome of the library's activities since 1901; member of the Century Association of New York. He has written 'A Library Primer' (1899); 'Notes on Bookbinding for Libraries' (1906) and several chapters in 'Modern American Library Economy'; and, with Henry W. Kent, edited 'Literature of Libraries in the Seventeenth and Eighteenth Centuries (6 vols., 1906–07). With C. L. Dana he compiled 'Horace: The Roman Poet Presented to Modern Readers' (1908), a selection of versions of the Odes; and published 'Copa: The Hostess of the Inn' (1909), a version of the pseudo-Virgilian poem.

DANA, Marvin, American writer: b. Cornwall, Vt., 2 March 1867. His published works include 'Mater Christi and Other Poems'; 'History of General Custer'; 'History of the Mormons'; 'Wars of the Century'; 'Studies in Criminology'; 'A Brief Universal History,' etc.

DANA, Richard, American jurist: b. Cambridge, Mass., 7 July 1699; d. 17 May 1772. He was a grandson of Richard Dana, the first of the family who came from England and settled at Cambridge in 1640. After practising law at Marblehead and Charlestown, he removed to Boston, where he became a leading barrister. He was distinguished for his prominence in the measures of resistance which immediately preceded the American Revolution. He was a leading figure and sometimes presided at the Boston town meetings from 1763 to 1772. It was the custom of Boston in those troubled times to address the country at large on public affairs under the form of published instructions to the representatives of the town. Warren, Hancock and the Adamses were on committees for this purpose. Dana was always a member, and often at their head. He reported the papers of 20 Nov. 1767 and 8 May 1770, noted at that time. He was a member of the association of the Sons of Liberty, and at their celebrated meeting of 17 Dec. 1769, administered to Secretary Oliver the oath of non-execution of the Stamp Act, and made and signed a solemn official record of that fact. In 1770 he was a member of the committee which made an investigation of the Boston Massacre.

DANA, Richard Henry, the Elder, American poet and essayist: b. Cambridge, Mass., 15 Nov. 1787; d. Boston, 2 Feb. 1879. He was a son of Francis Dana (q.v.); studied at Harvard College and was admitted to the Massachusetts bar in 1811. He was connected with the *North American Review* from its commencement in 1815, and his earliest writings first appeared in that periodical, of which he became joint-editor in 1818. His lectures on Shakespeare's characters, delivered in the principal cities of the Atlantic coast (1839–40), awakened a deep public interest. His principal poems are ‘The Change of Home’ (1824); ‘The Dying Raven’ (1825); ‘The Buccaneers’ (1827), specially noteworthy for its descriptions of the vicissitudes of ocean scenery. To a periodical publication, *The Idle Man* (New York 1821–22), of which he was editor, he contributed critical papers and several stories; among them ‘Paul Fenton’ and ‘Edward and Mary.’

DANA, Richard Henry, American jurist and miscellaneous writer: b. Cambridge, Mass., 1 Aug. 1815; d. Rome, Italy, 7 Jan. 1882. He was a son of the preceding. He entered Harvard College in 1832, but compelled on account of an affection of the eyes to suspend his studies in 1834, he undertook a voyage to California in the capacity of a common sailor. This voyage he described in a very interesting book, ‘Two Years Before the Mast’ (1840, enlarged edition 1869; latest edition by Dr. W. T. Grenfell, New York and London 1911), which still remains a classic in sea stories. Returning to college he completed his law course, and was admitted to the Boston bar in 1840, soon securing a large number of admiralty cases. In 1841 he published a treatise on seamanship, ‘The Seaman's Friend’ (republished in England as ‘The Seaman's Manual’), containing a treatise on practical seamanship, a useful dictionary of sea terms, and valuable information on maritime law. In 1859–60 he made a voyage round the world, visiting the Sandwich Islands, China, Japan, Ceylon, India and Egypt, returning through Europe. In 1861 he w United States attorney for Mas was counsel for the United Stat ceedings against Jefferson Davis for 1867–68. In 1866 he published a copiously tated edition of Wheaton's ‘Elements of In national Law.’ (See Two Years Before the Mast). Consult Adams, ‘Richard Henry Dana: a Biography’ (1890).

DANA, Richard Henry, American lawyer: b. Cambridge, Mass., 3 Jan. 1851. In 1874 he was graduated at Harvard University and three years later from the law school there. In 1878–79 he helped organize the charities department of the city of Boston and in 1884 drew up the bill subsequently passed by the Massachusetts legislature as the Civil Service Reform Act. In 1888 he drafted the New Ballot Act, which also became law, and has since been referred to as the Massachusetts Ballot. In 1889–92 he served as editor of the *Civil Service Record*. His published works are ‘Double Taxation in Massachusetts’ (1895); introduction and notes to speeches in ‘Stirring Times and Letters to a Son’ (1910); introduction and concluding chapter to ‘Two Years Before the Mast’ (1911); ‘The Corrupt Practices Act’ (1906); ‘Australian Ballot System of Massachusetts’ (1911); ‘Trent: an Aftermath’ (1912), etc.

DANA, William Parsons, American marine artist: b. Boston, Mass., 18 Feb. 1833. He studied in Paris under Picot and Le Poitevin, became a member of the National Academy in 1863 and obtained a third class medal at the Paris Exhibition of 1878 for his ‘Gathering Seaweed.’ Other good examples are ‘Embys Admiral’; ‘The Burning Wreck’; ‘Heartsease.’ One of his most noted pictures is the ‘Chase of the Frigate Constitution’ in the Metropolitan Museum, New York. He was elected to the National Academy of Design in 1867.

DANAE, dăn'ā-ē, in Greek mythology, daughter of Acrisius, king of Argos. She was shut up by her father in a brazen tower, because an oracle had declared that a son of his daughter should put him to death. But Zeus, inflamed with passion for the charming virgin, transformed himself into a golden shower, and descended through the apertures of the roof into her embraces. When Acrisius discovered that his daughter had become a mother he exposed her with her child, in a chest, to the violence of the waves. But the sea-goddesses, anxious for the preservation of the son of Jove, commanded the billows to bear the box safely to Seriphos, one of the Cyclades. Polydectes, or rather Dictys, the governor of the island, received her, and educated the child, which he named Perseus. She eventually accompanied her son to Argos where he accidentally killed Acrisius at Larissa. The story has been much used in literature and painting, especially in paintings by Rembrandt at the Hermitage of Saint Petersburg; Correggio at the Palazzo Borghese at Rome and Titian at the Museo Nationale at Naples.

DANAI. See Danaus.

DANAIS, dā'nạ-is, a genus belonging to the group *Nymphalidæ* (by some placed in *Papilionidæ*), the largest family of day-flying lepidopterous insects, widely scattered over the globe. *D.* (now usually called *Anosia*) *erippus* (or *archippus*) is prevalent in all parts of the United States. Its wings are varied with yellow, black and white bands and it occurs frequently in summer along country roads, in pastures, and wherever the milkweed, its favorite food, grows. It is known as the milkweed butterfly (q.v.) The chrysalis is well known for its beauty of green and gold. The caterpillar is marked with yellow and black bands. *Danais* is a famous globe-traveler, having spread by some unknown means from continents to islands of the ocean, and to Australia. Very beautiful species abound in India. In New Holland it was found that the natives, who called it «bugong moth,» valued it highly for food. By means of smothered fires they were able to suffocate and collect the «moths» in large quantities, after which the appendages were removed and the bodies were made into oily cakes. The South American species, which are distasteful to most of their enemies, are the object of mimicry by edible species.

DANAKIL, dä-nä-kēl' (singular DANKALI), the Arabic and now general name for the numerous nomad and fisher tribes inhabiting the coast of northeast Africa, from Massowah south to Tajurrah Bay, and from there southwest to Shoa. They belong to the Ethiopic Hamites, and are well built and slender, with features indicating an intermixture of Arab blood. In a country of waterless plains, they are generally nomads, living partly by caravan traffic and the slave trade, but mostly on the milk of their flocks.

DANAO, Philippines, (1) town on the east coast of the island of Cebú, four miles north of Compostela, and 18 miles north of the town of Cebú. The productions of the interior are important for exports, but the anchorage at Danao is not good enough to encourage steamers to load at this port. The road along the coast is in a good condition. Pop. 15,483. (2) Danao, a hamlet, is on the west coast of South Antique, Panay, four miles north of Dao. (3) A lake in West Leyte, south of Panangua crater. (4) A mountain peak on the island of Luzon. (5) A river in the northeast of Negros Occidental, rising in the crater of Solitario, flows east into a small bay, on the north shore of which is situated Escalante.

DANAUS, in Greek mythology, the son of Belus and twin-brother of Ægyptus, originally ruler of Libya. Fearing his brother, he fled to Argos with his 50 daughters, the Danaïdes, and here he was chosen king, in place of Gelanor. The 50 sons of Ægyptus followed him, and under the pretense of friendship sought the hands of his daughters in marriage. Danaus consented, but on the bridal night he gave his daughters each a dagger, and urged them to murder their bridegrooms in revenge for the treatment he had received from Ægyptus. All did so, except one, Hypermnestra, who allowed her husband, Lynceus, to escape. The fable states that in the under-world the Danaïdes were compelled, as a punishment for their crimes, to pour water forever into a vessel full of holes. From Danaus, the Argives were called Danai.

DANBURY, Conn., city in Fairfield County in the southwestern part of the State. This is one of two county-seats. It has railroads to New York, New Haven, Bridgeport, Hartford, Pittsfield, Poughkeepsie and Litchfield. These are all branches of the New York, New Haven and Hartford road. A right of way has been secured for extending the Westchester and Northern Railroad from White Plains to Danbury by way of Ridgefield. An electric railway connects Danbury with Bethel. Electric roads connect this city with Bridgeport and Golden's Bridge. Danbury is 62 miles northeast of New York and 63 miles west of Hartford. It is the centre of a picturesque mountainous country. The town is noted for its beautiful drives and healthful climate. Lake Kenosia, a small pleasure resort surrounded by summer residences, is about two miles west of the city. Danbury has public waterworks capable of supplying a city of 50,000 and was one of the first towns to establish a modern filtration system of sewage disposal. The place was settled in 1684 by families from Norwalk and was called Pahquioque, the Indian name, until 1702 when the general assembly granted a patent for a town under the name now used. In 1855 the southern part of the town was separated and incorporated under the name of Bethel. A city charter was obtained in 1880. Danbury is one of the leading felt hat manufacturing cities of the United States, making 75 per cent of the stiff hats, besides soft hats and hats in the rough. Thirty-four factories are engaged in this industry, which began in 1780, five in the preparation of fur for hats, two mills producing silk used in their manufacture, three making hat cases. There are foundries and machine shops, a paper mill, two silver plating companies, two electric supply firms, a lime kiln, underwear and silk factories, medical printing company, two savings banks, two national banks, 10 churches, a library, State normal school, high school, graded public and private schools. The United States census of manufactures for 1914 recorded for Danbury 124 industrial establishments of factory grade, employing 5,933 persons; of whom 5,290 were wage earners, receiving annually $2,963,000 in wages. The capital invested aggregated $7,689,000, and the year's output was valued at $10,582,000: of this, $4,781,000 was the value added by manufacture. The *Danbury News* with daily and weekly editions was established in 1870 by James Montgomery Bailey, known as the «Danbury News Man.» He was the author of humorous articles and several books including a history of Danbury. Julius H. Seelye, former president of Amherst College, and P. T. Barnum, the showman, were born in that part of Danbury that is now the town of Bethel. The town was destroyed by the British in 1777, when General Wooster was killed defending the place. Wooster Square and Wooster Cemetery were named in his honor. Among the public buildings are the courthouse, city hall, hospital, almshouse, new post-office and new armory. The agricultural fair held here every year has an average attendance of about 60,000. The famous Danbury Hatters' Case in which the Supreme Court of the United States held that labor unions came under the Sherman Act originated in this city. Pop. 22,000. Consult Bailey, 'History of Danbury 1684–1896' (New York 1896).

DANBY, Frank (Mrs. Julia Frankau), English author: b. 30 July 1864. She was educated privately by Mme. Paul Lafargue, the eldest daughter of Karl Marx, and in 1833 was married to Arthur Frankau, who died in 1904. She began work with dilettante journalism, wrote for the *Saturday Review,* became popular as a novelist, but abandoned writing for a few years in favor of studying engraving. Her early works are ‘Dr. Phillips’ (1887) and ‘A Babe in Bohemia’ (1889). After 10 years she wrote ‘Eighteenth Century Color Prints’ (1900); ‘Life of John Raphael Smith’ (1902); ‘The Lives of James and William Ward’ (1904). She relapsed into novel writing and published ‘Pigs in Clover’ (1902); ‘Baccarat’ (1904); ‘The Sphinx's Lawyer’ (1906); ‘A Coquette in Crêpe’ (1907); ‘The Heart of a Child’ (1908); ‘An Incomplete Etonian’ (1909); ‘Let the Roof Fall In’ (1910); ‘The Story of Emma, Lady Hamilton’ (1910); ‘Joseph in Jeopardy’ (1912); ‘Concert Pitch’ (1913); ‘Full Swing’ (1914); ‘Nelson's Legacy’ (1915); ‘The Story behind the Verdict’ (1915).

DANCE OF DEATH, a grotesque allegorical representation in which the figure of Death under various forms takes the lead, followed by dancers of all ages and conditions. It was frequently drawn by artists of the Middle Ages for cemeteries and cloisters. These representations were common in Germany, and also in France, where they received the name of *Danse Macabre.* This term is supposed by some to be derived from the Arabic *magbarah,* a cemetery, but much more probably from the *Chorea Machabæorum,* or dance of the Maccabees, a kind of dramatic representation performed in the Middle Ages, in which the seven martyred brothers mentioned in the second book of Maccabees (Apocrypha) would appear to have been introduced. A Dance of Death was painted on the walls of the churchyard of the Innocents at Paris, about the middle of the 15th century, which the chapter of Saint Paul's in London caused to be copied, to adorn the walls of its monastery. Gabriel Peignot, in the ‘Recherches sur les danses des morts et sur l'origine des cartes à jouer’ (Dijon and Paris 1826), investigated the origin of the Dance of Death in France, and explained the dancing positions of the skeletons, by the fact which old chronicles relate, that those who were attacked by the plague ran from their houses, making violent efforts to restore their rapidly declining strength by all kinds of morbid movements. The most remarkable Dance of Death was painted, in fresco, on the walls of the churchyard in the suburb of Saint John at Basel, which was injured, in early times, by being washed over, and is now entirely destroyed. This piece has been ascribed to Hans Holbein (q.v.), but it has long since been proved that it existed 60 years before his birth. It was painted at Basel in the year 1431, by an unknown artist, in commemoration of the plague, which prevailed there at that time. It represented Death as summoning to the dance persons of all ranks, from the Pope and the emperor down to the beggar, and was explained by edifying rhymes. That piece contained about 60 figures as large as life. Besides being ascribed to Holbein, as was before stated, it has also been ascribed to a painter named Glauber but without foundation. Holbein perhaps conceived, from this picture, the idea of his Dance of Death, the original drawings of which are at Saint Petersburg. Very fine engravings of these are in the ‘Œuvres de Jean Holbein, par Chrét. de Méchel’ (Vol. I, Basel 1780). Consult Goelte, ‘Holbein's Totentanz und seine Vorbilder’ (Strassburg 1897); Seelmann, ‘Die Todentänze des Mittelalters’ (Norden 1893).

DANCE, Saint Vitus. See CHOREA.

DANCING, a form of exercise or amusement in which one or more persons make a series of graceful movements in measured steps in accord with music. Aristotle ranked dancing with poetry, and Pindar applies the name of “The Dancer” even to Apollo. Dancing corresponds to a universal primitive instinct in man, and is practised by the South Sea Islanders, the Forest Indians of Brazil, the Zulus, the negroes of central Africa and the native Australians, exactly as it was in the earlier stages of every civilized modern race. Ferocious war-dances were practised by savage warriors, as the North American Indian braves, who brought on a frantic mechanical intoxication capable of carrying them to victory. The Zulu war-dance is a noble exercise for warriors, like the Pyrrhic dance of the ancient Spartans; and the dancing and spinning dervishes in the East, who work themselves into spasms of physical excitement, are still highly esteemed for devoutness and piety. The idea of magic always enters into savage dancing. Thus, the Mandan Indians dance the buffalo-dance to bring game when supplies of food are low. The rain doctors of central Africa dance mystic dances to bring rain; and the wives of the Gold Coast negroes dance a battle-dance to give their absent husbands courage in battle.

The art of dancing dates back to the early Egyptians, who ascribe that invention to their god, Thoth. Among the ancient Jews, Miriam danced to a sound of trumpets, itself an act of worship, and David danced in procession before the Ark of God. Religious processions went with song and dance to the temples; the Cretan chorus moving in measured pace sang hymns to the Greek god, Apollo, and one of the Muses (Terpsichore) was the special patroness of the art. The Phrygian Corybantes danced in honor of Cybele, and the festivals of Rhea Silvia at Rome were also accompanied with wild dances, while during the early festival of Mars the Salian priests sang and danced, beating their shields. The Spartans practised dancing as a gymnastic exercise and made it compulsory on all children from the age of five. The Romans in general considered it disgraceful for a free citizen to dance except in connection with religious rites, but willingly witnessed the performances of professional dancers like the Almé of modern Egypt, and the Bayadéres, or Nautch girls, of India. The early Christians practised choral dances, which came into discredit with the love-feasts or Agapæ. A survival of religious dancing is still seen even within the pale of Christendom, where during the Corpus Christi octave a ballet is danced every evening by boys from 12 to 17 years of age, wearing plumed hats and in the dress of pages of Philip III's time.

The Puritan ancestors saw deadly sin in promiscuous dancing. Father Mariana tells us that the famous saraband worked more mischief than the plague. The fandango was hotly condemned by the clergy, but when danced before the Sacred College, who wished to see it before prohibiting it, so charmed the judges that they gave it their unanimous approval. Many of the mediæval dances were solemn and stately in character like the *danses basses,* which were danced to psalm tunes at the court of Charles IX of France. It is said that the whole august Council of Trent danced at a ball given in 1562 to King Philip II of Spain. The *Galliarde* and *volta* were introduced into France from Italy by Catharine de Medici. Dancing reached its height during the reign of Louis XIV, who was himself an enthusiastic dancer in the court ballets.

The minuet was a favorite in France for a century; and then came the quadrille or *contre-danse,* often connected erroneously with the English country-dance; the Écossaise was first introduced in 1760; the galop was introduced from Germany; the cotillion was fashionable under Charles X; polka was first danced at the Odéon in 1840 by a dancing master from Prague; the polka tremblante or schottisch, was of Bohemian origin and was first brought out in Paris in 1844; the lancers was introduced by Laborde in 1861; and the waltz, originally Bavarian, and now modified from its original form, promises to retain its supremacy.

Characteristic of particular races or merely of classes of people are such forms of the dance as the Scotch reel, Highland fling and strathspey, the Irish jig, the negro breakdowns, sailors' hornpipe, step-dances, the can-can, morris dances, etc.

A ballet is a theatrical exhibition composed of dancing, posturing and pantomimic action. The Roman pantomimes bore a strong resemblance to the modern *ballet d'action.* In an entertainment given to celebrate the victory of Actium, the «Trachiniæ» of Sophocles, and an erotic interlude founded on the myth of Leda, were performed in dumb show, the dancers Pylades and Bathyllus taking the leading parts; and the whole wound up with a Pyrrhic war-dance. Some tradition of this form of entertainment doubtless suggested the courtly dances which became fashionable in the early days of the Renaissance. The first on record was that given by Bergonzio di Botta, at Tortona, to celebrate the marriage of the Duke of Milan in 1489. This was famous throughout the civilized world. From that time great events, such as royal marriages and births, were celebrated by grand productions of ballet on which enormous sums of money were lavished. These ballets were frequently historical in subject, treating of the siege of Troy, the conquests of Alexander and similar events. There were also mythological, poetical, moral and fantastic ballets, on such subjects as the Judgment of Paris, the Seasons, Truth, the Diversions of the Carnival, etc. All these were in five acts, each of which consisted of 3, 6, 9 or 12 entries, and in all of them singing and recitation mingled with the dancing.

Catharine de Medici introduced the ballet into France, and encouraged dances by females that would now be deemed highly improper, to distract the attention of her son, Henry III, from state affairs. Henry IV was a great supporter of the ballet, no fewer than 80 grand entertainments being given by him between 1589 and 1610. Louis XIII and Louis XIV carried their love of ballet to an extreme length, and themselves danced publicly. In 1661 the latter founded an Academy of the Dance, with Quinault as director and Lully as composer. It was not until 1681 that female dancers appeared in public, the first being four ladies, who danced «La Triomphe de l'Amour.» In the early part of the 18th century the names of professional dancers began to appear, two of the most famous being Mlles. Salle and Camargo, immortalized by Voltaire. The great male dancer of his time was Dupré, the predecessor of the universally known Gaetano Vestris.

In 1697 De la Motte introduced more changes into the ballet, chiefly in the direction of more interesting subjects, and about the same time comic ballets were invented by Danchet; but no important alterations were made till the advent of Jean Georges Noverre in 1749. The dancers wore masks, huge wigs and headdresses and hoops. The mask finally disappeared in 1773. Hitherto the form of the ballet had remained practically unchanged, each act being performed by different dancers, and generally in different styles of dancing. Noverre invented the *ballet d'action,* and revived the art of pantomime. Dancing now had dramatic meaning, and the most intricate plots were represented by pantomime alone. The principles of Noverre were carried to great perfection by Vincenzo Galleotti in Copenhagen, and by his successor, Bournonville. Under the Directory a form of grand ballet was revived, in which patriotic songs were a feature.

The history of the ballet since Noverre's time is a history of dancers rather than of dancing. In England, this class of entertainment was never more than an exotic, and has practically no history. The word *balette* is first used in English by Dryden (1667), and the earliest attempt at a descriptive ballet seems to have been 'The Tavern Bilkers,' played at Drury Lane in 1702. Within the last few years an important revival of the ballet has taken place in Italy, where the famous «Excelsior,» by the Chevalier Luigi Manzotti, Messalina, Amor, etc., have furnished magnificent examples of the *ballet d'action.*

Skirt-dancing, so called on account of the voluminous skirts made of sheer or flimsy material, which are worn by the dancers and play so important a part in their dances, has become a science and a popular attraction on the stage. The dancers, by the clever manipulation of their draperies and assisted by light effects, assume such forms as flowers; the rose, calla lily, pansies, pinks; butterflies of different colors and flags of various nationalities; all to the accompaniment of music. Among the most noted skirt dancers were Amelia Glover, Loie Fuller, the inventor of the serpentine dance, Papinta and Anna Held. In 1911 the «negroid and animal» dances began by the introduction of the *turkey-trot* in San Francisco. Variations of it known as *grizzly bear, Texas Tommy,* and others, soon followed and spread rapidly over Europe and America. Even more popular was the Argentine tango in an expurgated form. Consult Caffin, 'Dancing and Dancers of Today' (New York 1912) and Flitch, 'Modern Dancing and Dancers' (London 1912).

DANIEL FROHMAN.

DANCING DISEASE, an epidemic nervous disorder, apparently allied to hysteria and chorea (qq.v), occasionally prevalent in Germany and Italy during the Middle Ages. In the last-mentioned country the disease was ascribed to the bite of a spider called the tarantula and was hence known as tarantism; but as scarcely any of those affected with it had any consciousness of being bitten by a spider or any other insect, and as it has been in every instance chiefly propagated by suggestion, like chorea, there is every reason to conclude that it had a like origin. In 1734, during the celebration of the festival of Saint John, at Aix-la-Chapelle, the streets became crowded with men and women, of all ranks and ages, who commenced dancing in a wild and frantic manner, many losing entire control over themselves, and continuing to dance until dropping down from fatigue, and some, in a moment of frenzy, dashing out their brains against walls. The mania spread to Cologne, Metz and Strassburg, and gave rise to much imposture, profligacy and disorder. At the beginning of the 17th century the epidemic began to decline and is generally known now in Europe only as a nervous affection in individual cases. Similiar outbreaks, however, are common in some Oriental countries and have been known to occur in Europe in connection with religious fanaticisms. Consult Hecker, ‘The Dancing Mania of the Middle Ages, (3d ed., London, 1859).

DANCING FAUN, a frolicsome sylvan creature, half-human, half-goat, corresponding to the Greek Satyr, only gayer and less hideous than his woodland brother; often used in ancient comedy as the very embodiment of humor and mischief. Poets, painters and sculptors of every age have loved to depict the faun in the madness of dancing. A bronze representation was found in a house at Pompeii in 1853.

DANCING TERMS: Balancez — set to partners; chaine anglaise — the top and bottom couples right and left; chaine anglaise double — the right and left double; chaine des dames — the ladies' chain; chaine des dames double — the ladies' chain double, which is performed by all the ladies commencing at the same time; chassez — move to the right and left; chassez croisez — gentlemen change place with partners and back again; demie chaine anglaise — the four opposite persons right and left; demie promenade — all eight half promenade; demie moulinet — the ladies all advance to the center, giving hands, and return to places; la grande chaine — all eight chassez quite round, ladies starting to their left and gentlemen to their right, giving alternately right and left hands; la grande ronde — all join hands and advance and retire twice; pas d'allemande — the gentlemen turn the partners under their arms; traversez — the two opposite persons change places; vis-à-vis — the opposite partner.

DANCLA, dän-klä, **Jean Baptiste Charles,** French musical composer and violinist: b. Bagnères de Bigorre, 19 Dec. 1818; d. 1907. He was a pupil at the Conservatory of Paris, where he took the first prize for the violin in 1833, at the age of 15, becoming professor there in 1857. He displayed remarkable fecundity as a composer, among his works being: a ‘Method of the Violin,’ studies, sonatas, solos, fantasies and airs for that instrument; symphonies, trios and quartettes for stringed instruments; ‘Christopher Columbus,’ a dramatic scene for an orchestra; a volume of ‘Notes and Souvenirs’ (1893).

DANCOURT, däṅ-koor, **Florent Carton,** French actor and playwright; b. Fontainebleau, 1 Nov. 1661; d. Courcelles-le-Roi, France, 6 Dec. 1725. Although he personated the first characters in high comedy, he succeeded best as an author in low comedy. He displayed much ingenuity and wit in introducing upon the stage amusing subjects of real occurrence in his time. Louis XIV was very fond of humorous pieces, and Dancourt often used to read his productions to the king before they were played. Among his dramas are ‘Le chevalier à la mode’ (1687); ‘Les bourgeoises de qualité’ (1700); ‘Les trois cousins’ (1700). His daughters, Manon and Mimi, became noted actresses in the Théâtre Français. His works were collected (12 vols., 1760), and selected plays were published by Sarcey, F., in ‘Théâtre Choisi.’

DANDELION, a common and well-known plant, *Taraxacum taraxacum*, belonging to the chicory family. It yields a milky juice, which in the form of extract is used medicinally as a diuretic and alterative. It contains a bitter crystalline principle called taraxacin. Its root has been used to adulterate coffee in a similar way to chicory, and is used to adulterate chicory itself. The blanched leaves are eaten as a salad. In America it is a common article of food in the spring of the year, boiled and eaten as «greens.» It has a naked, hollow stalk, with a single bright yellow flower-head. The seed is furnished with a fine white pappus, by means of which it is carried far and wide by the wind. The leaves are lanceolate and sinuous, rising from a taproot in the form of a rosette. The plant is probably native in certain parts of America, but is found as a weed in all parts of the civilized world.

DANDIE DINMONT. See Dog.

DANDOLO, dän'dō-lō, **Andrea,** doge of Venice and Italian historian: b. about 1310; d. September 1354. He became doge in 1343. He carried on a war against the Turks with various success, and greatly extended Venetian commerce by opening a trading connection with Egypt. The jealousy entertained by the Genoese of this new trade produced a war between the two states, which gave rise to a correspondence between the doge and Petrarch, who exhorted him to peace. To Andrea Dandolo is ascribed the compilation of the sixth book of Venetian statutes; but he is most distinguished for his ‘Chronicles of Venice,’ written in Latin, and comprehending the history of the republic from its commencement to 1342. It is praised for its impartiality and for its judicious use of authentic documents, and was first published by Muratori in his collection of original Italian historians.

DANDOLO, Enrico, doge of Venice: b. Venice about 1108; d. Constantinople 14 June 1205. He was chosen to office in 1192, at the advanced age of 84. He had a defect of sight approaching nearly to blindness; but neither that circumstance nor his age impaired the vigor of his administration, the events of his government being among the principal causes of the Venetian greatness. On the formation of the league for the fourth Crusade, under Baldwin, Earl of Flanders, Dandolo induced the

Senate to join in it, and by this policy the first hostilities of the armament were directed against Zara, which had revolted from Venice, and thereby greatly extended the Venetian boundaries, gaining possessions in the Ionian Sea, Phrygia, Morea, Epirus and the island of Crete (by purchase). On the storming of Constantinople the aged doge, it is said, was the first who mounted the walls. When the Crusaders proceeded to the election of a new emperor of the city Dandolo was first nominated; but in consequence of his age and the incompatible character of doge, he declined, and the choice ultimately fell on Baldwin. In the sharing of the Imperial dominions Venice obtained a full moiety and Dandolo was solemnly invested with the title of Despot of Romania.

DANDRUFF, a condition of scaliness in the head, attended with desquamation or scaling of the superficial layers of epidermis. It may simply indicate a dry and unhealthy skin, or it may be the result of several distinct skin diseases, chief of which is pityriasis. There is usually a slight amount of itching, and on scratching the head large quantities of minute scales are detached and fall on the clothing. Dandruff also occurs from seborrhœa, in which case it is due more to a mild inflammation of the sebaceous follicles of the skin. The sebaceous matter from the glands dries and forms scales. One of the general results arising from dandruff is a gradual loss of hair. The treatment consists in better hygiene of the head, shampoos and careful stimulation by appropriate tonics. Many of the so-called hair tonics are valueless. Vigorous rubbing of the scalp, with periodical shampooing, is one of the best means of combating this condition, but medical advice should always be sought as to the exact cause of the dandruff. See HAIR.

DANE, Nathan, American jurist: b. Ipswich, Mass., 27 Dec. 1752; d. Beverly, 15 Feb. 1835. He was graduated from Harvard in 1778, studied law in Salem, Mass., and began practising in the adjoining town of Beverly in 1782, where he resided until his death. In 1812 he was chosen an elector of President of the United States; in 1814 he was a member of the Hartford Convention; and in 1820 he was a member of the convention for revising the constitution of Massachusetts. While he was a delegate from Massachusetts to the Continental Congress in 1786, the best method of providing for the government of the vast territory owned by the Confederacy north and west of the Ohio River came into consideration. It was determined to do this by an ordinance which should establish with much detail not only the foundation of that government, but the leading principles which should prevail in the systems of law and public policy to be in force there. The drafting of this instrument was entrusted to Dane, and it was adopted by Congress without a single alteration, 13 July 1787. The name of the "Northwest Territory" was given to it; and it comprehended all the territory at that time belonging to the Confederacy northwest of the Ohio. He incorporated in this ordinance a prohibition against all laws impairing the obligation of contracts, which the convention that formed the Constitution of the United States, a few months afterward, extended to all the States of the Union, by making it a part of that Constitution. His 'Abridgment and Digest of American Law' appeared 1823–29. In 1829 he gave to the law school in Harvard University $10,000 (adding $5,000 more in 1831) for the foundation of the Dane professorship of law.

DANE, The Great. See DOG.

DANEBROG, dăn'ĕ-brŏg, the Danish national flag (*brog* simply meaning cloth), which was carried at the head of the army, like the oriflamme of France. It is red with a white cross in the centre, and, as the legend has it, fell from heaven, as an omen of victory, when the pious Danes under Waldemar II were besieging the pagan town of Reval. In memory of this auspicious event the king founded the order of the Danebrog, which fell into abeyance, however, at a later period. In 1671, under Christian V, and again under Frederick IV, it was revived. It may be conferred upon all ranks, and may be awarded for military or civil services. The decoration consists of a white enameled gold cross, suspended by a white ribbon with a red border.

DANEFF, Stojan, Bulgarian statesman: b. Shumla 1858. He was educated in Bohemia and at the universities of Paris and Heidelberg, became member of the Commission of Codification after the Russo-Turkish War, in 1901 became Minister of Education. In 1902–03 he was Prime Minister and Minister of Foreign Affairs, and again for a few days in 1911. He became president of the Sobranje in the same year and in 1912 was one of a commission of three in the negotiations with Turkey over the armistice. In December 1912 he was again on a commission of three who went to London for the Balkan-Turkish Peace Conference, in which he bore a leading part. He was the Bulgarian signatory to the Peace of London between the Balkan States and Turkey concluded 30 May 1913.

DANEGELD, dăn'gĕlt, or **DANEGELT** (A.-S. *Dene,* Danes; *gild, geld,* payment), an ancient annual tax of the Anglo-Saxons, to maintain forces to resist the Danes. It was first paid in 991, when Ethelred purchased the retreat of the invaders, which had reached as far as Maldon. The tax was continued until the time of Stephen, as one of the rights of the Crown. It was not actually repealed until Henry II's time (1163).

DANELAGH, dăn'lâ, the ancient name of a strip of territory extending along the east coast of England from the Thames to the Tweed, ceded by Alfred the Great to Guthrun, king of the Danes, after the battle of Ethandune. This name (Danelagh or Dane-law) it retained till the Norman conquest, and its inhabitants were governed by a modification of Danish law and not by English law. King Canute, to prevent any changes in the laws, had them gathered together and taught to the people.

DANENHOWER, dä'nĕn-how-ėr, **John Wilson,** American Arctic explorer: b. Chicago, Ill., 30 Sept. 1849; d. Annapolis, Md., 20 April 1887. He was graduated at the United States Naval Academy in 1870, and took part in a surveying expedition to the northern Pacific on the *Portsmouth.* He joined the *Jeannette* expedition, which started from Havre, France, went to San Francisco, and thence sailed, 8 July 1879, for the Arctic Ocean, via Bering Strait. The vessel was lost in the ice and the crew after dragging their boats over the frozen deep for 95 days reached the open sea. A terrible storm separated the boats and none ever was heard of except the one in which Lieutenant Danenhower had embarked. It reached Lena Delta, 17 Sept. 1881, and he arrived in the United States in June 1882. He wrote 'The Narrative of the Jeannette.'

DANES ISLAND, a place made noted by Andrée, the Arctic explorer, who, on 11 July 1897, started from this island on his fatal polar expedition. It is a small island off the coast of the Spitzenbergen group and to the northwest.

DANEWERK, dä'nĕ-vĕrk (Danes' work), an ancient wall from 30 to 40 feet high and of an equal thickness, constructed of earth, stone and wood, about the middle of the 10th century, seemingly as a protection against the Saxons. It extended along the southern frontier of Schleswig for a distance of nearly 10 miles, and being defended by a series of forts the Danes relied upon it to check the approach of the German troops during the Schleswig-Holstein war of 1864. It was soon discovered that their army was too weak for the defense of so extensive a line, and the position was abandoned. The wall was soon after leveled to the ground.

DANHAUSER, Joseph, Austrian painter: b. Vienna, 18 Aug. 1805; d. 4 May 1845. He turned his attention at first to historical painting and living for some time at Venice, fell under the influence of the works of Titian and Paolo Veronese, and followed religious painting for a while, later becoming a genre painter, which better suited his talent. Among his historical pictures is 'Etienne the Fortunate Offering the Crown of Hungary to the Virgin' (1832). An altar piece in the cathedral at Erlau, representing the martyrdom of Saint John, and an 'Abraham Driving Away Hagar and Ishmael' are noted among his religious pictures. He is perhaps best known by his humorous scenes depicting the manners and customs of Austrian life. Of these there are several in the Imperial Museum at Vienna. Many of his works have been popularized by engraving, such as 'Cured without knowing it'; 'The Oculist'; 'The Prodigal'; 'Reading the Will'; 'Soup at the Convent'; 'Wine, Women, and Song'; 'Judge and Lawyer'; and 'The Evening Festival,' his last work.

DANICHICH, dăn'ē-chich, **Dyuro** (Serbian Djuro Daničić), Serbian philologist: b. Neusatz, 1825; d. 1882. Educated at Neusatz, Presburg and Buda-Pesth, he came to Vienna in 1845 where he met the famous Serbian scholar Vuk Stefanovich-Karadjich, and dedicated all his efforts to the study of Serbian and other Slavonic languages. In 1855 Danichich came to Belgrade to take the chair of Comparative Slavonic philology at the City College. He also became librarian of the Serbian National Library and member and secretary of the Serbian Academy of Sciences. In 1865 he lost his chair in the Belgrade City College, through certain intrigue, but was immediately invited to Agram to take the secretaryship of the South-Slav Academy of Sciences, which position he accepted. All his activity tended to prove the unity and the identity which naturally exists between the Serbians and the Croatians but which have been endangered by foreign and religious influences. While still a student he had written 'The War for Serbian Language and Orthography.' The publication of that book strangely enough was prohibited in Vienna "for higher political reasons," but it was published at Budapesth and caused a sensation throughout the Slav world. His translation in modern Serbian of the 'Old Testament' was published together with Vuk's translation of the 'New Testament' but the book was suppressed in Serbia by prejudiced authorities. By his 'Akcenti u glagola' ('Accents in Verbs') he definitely established the existence of four main accents in the Serbian idiom. His much more important works 'Serbian Grammar' (Vienna 1850; 8th ed., 1892); 'History of the forms of the Serbian or Croatian Language to the End of the 18th Century,' 'A Concordance of old Serbian Literary Monuments' and his collection of material for a standard dictionary of the Serbo-Croatian language as also his monographs dealing with the ancient monuments of the Serbian tongue (Domentian's 'Life of Saint Sava'; 'Life of Saint Simeon and Saint Sava'; Danilo's 'Lives of Serbian Kings and Archbishops') have earned for him a very high place in the history of Serbian philology.

DANIEL (Heb. "God is my judge"). The hero and putative author of the book of Daniel. According to this book, he was carried away from Jerusalem by Nebuchadnezzar in the third year of Jehoiakim, i.e., 606 B.C. Although at the time a youth, he was old enough to be "skilful in all wisdom, cunning in knowledge, and understanding science." For three years he was taught the literature and language of the Chaldæans, and at the end of this period excelled in wisdom all the magicians and enchanters of the realm. In the second year of Nebuchadnezzar (604–03 B.C.) he was able, not only to interpret a dream of the king, but to tell him what the dream had been (ii). Later he explained the meaning of another dream which referred to a coming period of insanity in the king's life, with the result that after the humiliating experience Nebuchadnezzar was led to worship Daniel's God (iv). On the night when King Belshazzar, son of Nebuchadnezzar, was overthrown by Darius the Mede, son of Xerxes, Daniel read the handwriting on the wall and announced to him its solemn significance, whereupon he was clothed with purple and proclaimed one of the three highest rulers under the king (v). This position he retained under Darius the Mede, who even contemplated making him grand vizier with authority over all others. When his rivals forced this monarch to cast him into the lions' den for breaking a royal decree in regard to religion, he was found uninjured in the morning, they were punished, and the worship of his God was enjoined upon all men in the kingdom (vi). Daniel not only interpreted the dreams of others but also had dreams and visions of his own, in the first year of Belshazzar (vii), the third year of this king (viii), the first year of Darius the Mede (ix), the first year of Cyrus, according to the Greek, or third, according to the Hebrew (x), and again in the same first year, according to the Greek and Theodotion (xi). The historical character of this Jewish sage, master of magicians and statesman, holding high positions at the court of Chaldæan, Median and Persian kings in the course of 70 years, is made doubtful by certain peculiarities of statement that cannot altogether be due to errors of transcription but seem to reveal a serious want of familiarity on the part of the author or authors with the period in which the hero's career is laid. Thus there is no evidence that Jerusalem was captured by Nebuchadnezzar in 606 B.C., and he was not then king. No son of his by the name of Belshazzar sat upon the throne of Babylon. Bil-shar-uzur, the son of Nabunaid, the last king of Babylon, seems to have been mistakenly supposed to be a king and a son of Nebuchadnezzar. History knows no Darius the Mede, son of Xerxes, and immediate successor of the last Babylonian king. Darius Hystaspis seems to have been meant, but he was the father of Xerxes, and not his son, and the successor of Gaumata, not of Belshazzar.

In Ezekiel xiv, 14, 20, Noah, Daniel and Job are quoted as examples of righteousness; but it is declared that even they could only save themselves if they were in a country that had sinned and against which destruction by famine, wild beasts, sword or pestilence had been decreed. In Ezekiel xxviii, 1ff, the prince of Tyre is charged with claiming that he is a god; his divinity is denied, but it is admitted that he is wiser than Daniel, and that there is no secret that can be hidden from him. If these passages were written by Ezekiel in 592 and 586 B.C., it would be difficult to avoid the conclusion that Daniel was already at that time a figure belonging to antiquity like Noah and Job. But some scholars consider them either as interpolations or as parts of a late work showing acquaintance with the book of Daniel in its earliest form. The version of the Achikar story discovered in the Elephantine papyri indicates that already in the century following the downfall of the Assyrian empire narratives began to circulate concerning grand viziers of kings like Sennacherib and Esarhaddon, and the part that Achikar plays in the Tobit story shows how easily a popular figure of this kind could be appropriated. On the other hand, the career of a Nehemiah suggests the possibility of a nucleus of historic fact even where the extant documents are not of such a nature as to warrant a marked degree of confidence. It is perhaps significant that the name Daniel occurs in Ezra viii, 2, and Neh. x, 6, in lists which also contain the names of Mishael, Azariah and Hananiah. For literature see DANIEL, BOOK OF.

NATHANIEL SCHMIDT.

DANIEL, Anthony, French Jesuit missionary in North America: b. Dieppe 1601; d. 4 July 1648. In company with the Sieur de Champlain he came to Quebec in 1633 and was soon after transferred to the mission among the Huron Indians. He was shot during an attack upon the town of Saint Joseph by a band of hostile Iroquois. Consult Parkman, ‘The Jesuits in North America’ (Boston 1867).

DANIEL, John Moncure, American journalist: b. Virginia 1825; d. 1865. He became a member of the staff of the Richmond *Examiner* in which capacity his free speech obliged him to engage in several duels. He was appointed Minister to Sardinia in 1853, but his indiscreet action in several matters seriously impaired his influence as a diplomatist. During the Civil War he served in the Confederate army for a time, but being wounded, retired, resuming his editorship of the *Examiner*. He attacked in its columns the president and treasurer of the Confederacy, and in consequence was obliged to fight a duel with the latter. His writings were published by his brother (New York 1868).

DANIEL, John Warwick, American politician: b. Lynchburg, Va., 5 Sept. 1842; d. there, 29 June 1910. He served in the Confederate army during the Civil War; subsequently studied law and entered upon the practice of his profession. He was a member of the Virginia legislature 1866–72 and 1875–81; and was defeated for governor of his State in 1881. He was a member of Congress 1885–87; entered the national Senate in the year last named and was re-elected at the expiration of his term. He published ‘Attachments Under the Code of Virginia’; ‘Negotiable Instruments’; ‘The Character of Stonewall Jackson’ (1868); ‘Speeches and Orations’ (1911).

DANIEL, Hermann Adalbert, German author and hymnologist: b. Köthen, 18 Nov. 1812; d. Leipzig, 13 Sept. 1871. In 1835 he received the degree of Ph.D. from the University of Halle, and for nearly 20 years occupied an inferior position in that university. In 1854 he became professor, and continued to serve until 1870, when he resigned and retired to Dresden. He was the author of geographical, scholastic and liturgical works. His most noted work was his great collection of hymns: ‘Thesaurus Hymnologicus sive Hymnarum, canticorum, sequentiarum, circum annum M.D. usititarum, collectio amplissima’ (5 vols., Halle 1841–43). Sets are now quite scarce and sell for a good price.

DANIEL, Samuel, English historian and poet: b. Taunton, England 1562; d. Beckington, Somerset, 14 Oct. 1619. As an historical poet Lucan seems to have been his pattern. He bestowed much labor on the poem in eight books ‘History of the Civil Wars between the Houses of York and Lancaster.’ Daniel contributed much to the improvement of the poetical diction of England. His stanzas, formed with a careful attention to the Italian octave, have more dignity and euphony than most verses of this sort in English literature in the first half of the 17th century. He is not wanting in rhetorical beauty and force. He was also the author of some poetical epistles, pastorals, 57 sonnets and a few tragedies. The first seem to have excited much attention. During the reign of Queen Elizabeth he wrote a sketch of the history of England till the time of Edward III, a work learned and clear, without ostentation and containing useful and acute views. His complete works were edited by Grosart (5 vols., London 1885–96).

DANIEL, Book of. In the Greek Bible and its daughter versions, as well as in the Syriac Peshita, the Latin Vulgate and most modern translations, the book of Daniel has a position among the Prophets; but in the Hebrew Bible its place is among the Hagiographa, near the end of the collection. The earliest testimony of the latter arrangement is found in the Babylonian Talmud ‘Baba bathra’ 14b. Though it is uncertain at what time the prophetic rolls in the Alexandrian synagogue were arranged in a definite order, the inclusion of Daniel can scarcely have been a late innovation, since Jews and Christians alike who used the Greek Bible in the 1st century A.D. appear to have considered him as a prophet and made no distinction between his book and those of other prophets; Josephus regarded him as «one of the greatest» of the prophets, 'Antiquities' x, 266, and obviously included his book among the 13 prophets, 'Ag. Apion' 1, 40, and he was referred to in Matt. xxiv, 15, as «Daniel the prophet.» It is, therefore, probable that the book was relegated to the third division of the canon in the 2d century A.D. The reason may have been its powerful influence in fanning the Messianic hope and the use of it by the Christians.

The Massoretic text differs from all early versions, with the doubtful exceptions of the Syriac Peshita and Aquila, in excluding the deutero-canonical parts, and especially from the oldest Greek version in many other respects. There is a tendency at present to assume that the prayer of Azariah, the hymn of the three friends of Daniel, the fable of Susanna and the stories of Bel and the Dragon were translated from an Aramaic original. But it is also widely recognized that these sections are likely to be later additions in the original, though earlier than the Greek version. The oldest testimony to the text is unquestionably this Greek version for which the Church substituted Theodotion's. The latter seems to have had for its foundation a version of which traces are already found in the 1st century A.D. There is no valid reason for questioning that the old Greek translation was a fairly faithful, though not very elegant, rendering of the text current about 100 B.C. This text itself was not free from additions and transpositions; but its most important characteristic was the apparent absence in it of many later embellishments of the Massoretic text. Thus the image of gold was 6 cubits high, and not 60 (iii, 1), and the enemies who secured the edict from the king, spied upon Daniel, had him punished, and were themselves thrown to the lions together with their families (vi) were the two fellow-presidents, and not all the rulers of the empire. The only manuscript extant of the old Greek version was published by Magistris in 1772, and by Cozza in 1877; a valuable Syriac translation of it made by Paul of Tella in 617 A.D. was published by Bugati in 1788, and by Ceriani in 1874. The Old Latin, Coptic, Ethiopic, Arabic, Georgian, Armenian and Slavonic versions were made from Theodotion, the Syriac Peshita and the Latin Vulgate from a Hebrew-Aramaic text nearer the Massoretic.

One part (i, 1-ii, 4a; viii-xii) of the proto-canonical book is in Hebrew, another part (ii, 4b-vii, 28) in Aramaic. The Hebrew is of a late type; the Aramaic is not Mesopotamian or Babylonian, but the Judean dialect. Various theories have been proposed to explain this bilingual character. Some have thought that the author began his work in Hebrew, but changed into Aramaic to reproduce the words of the Chaldæans in the dialect they spoke, or he supposed that they spoke, and then returned to the Hebrew to conceal in the sacred tongue what was meant only for the wise men of his own people. Corrodi, 'Kritische Geschichte des Chiliasmus' (1781), suggested that the whole book was originally written in Hebrew, but that the author himself translated some parts into Aramaic; Lenormant, Bevan, Haupt, Barton, Prince, Riessler and G. Jahn thought that, a part of the original having been lost, the Aramaic translation was substituted for it. Huet, 'Demonstratio evangelica' (1679), Marti, Buhl, Wright, Charles and Buttenwieser have expressed the view that the whole book was originally written in Aramaic, but that either the beginning and the end were translated into Hebrew or the original was used for certain missing parts of the Hebrew translation. Spinoza, 'Tractatus theologico-politicus' (1670), supposed that the Aramaic parts were written by Chaldæan chroniclers. Eichorn (*Allgemeine Bibliothek*, 1787), considered ii, 4b-vii as an earlier Aramaic work, while he assumed that the remainder was written in Hebrew. This view has been revived by Meinhold, Strack, Dalman, Torrey, Sellin, Kent and Schmidt. Most of these students look upon i-ii, 4a as a translation from the Aramaic and vii as an Aramaic version. It seems more probable that the story-book was written in Aramaic, that vii was a late addition to this work in the same language, and that the author of the visions, who affected the use of Hebrew, wrote i-ii, 4a as an introduction to take the place of some other exordium.

In earlier times the unity of the book was generally accepted, the only apparent exception being Josephus who speaks of several books written by Daniel, 'Antiquities' x, 267. Even the deutero-canonical sections were widely regarded as a part of the original work, in spite of Jerome's attitude, and the ascription of xiv to «the prophet Habakkuk.» Until the 17th century the entire Hebrew-Aramaic text seems to have been assigned to the same author. But Spinoza distinguished between the stories which he did not ascribe to Daniel, and the visions. A similar view was taken by Isaac Newton (1732) and Isaac Beausobre (1742), while Edward Wells, 'A Help to the Understanding of Daniel' (1716), suggested that chapter i was written after Daniel's time. J. D. Michaelis (1772) regarded the book as made of independent sections; Eichhorn (1787) regarded ii-vi as a work later than the exile but earlier than the Maccabæan age when i, vii-xii were written; and Bertholdt (1808) considered the book as a compilation of at least seven distinct pamphlets, the visions from the days of Antiochus IV, and the stories earlier. Volney, 'Recherches nouvelles sur l'histoire ancienne' (1814), thought of several authors living after Antiochus IV, one of them in the Roman period. Lagarde (*Gött. gelehrte Anzeige*, 1891), maintained that vii was written in 69 A.D., and that Josephus did not have in his copy either vii or ix-xii. Hertlein has developed the theory more fully, assigning ii, vii, ix-xii to the year 70 A.D. Barton (1898) suggested, in addition to the introductory chapter, nine independent pamphlets written by three or four different authors between 168 and 164 B.C. Views similar to that of Eichhorn have been expressed by Meinhold (1884), Strack, Wildeboer, Torrey, Kent, Sellin and Schmidt. Meinhold assigned ii-vi to the first part of the 3d century, vii-xii to the Maccabæan period, and Torrey called special attention to the fact that no event later than the reign of Ptolemy III seems to be alluded to in ii, and dated the story-book c. 242 B.C. It seems necessary to assume several literary strata, such as (1) the 3d century Aramaic story book in which iii appears to have been a later insertion; (2) Daniel's vision in Aramaic (vii), added to the story-book soon after 168 B.C.; (3) the visions in Hebrew (viii-xii) and the introduction in 165 B.C.; (4) the prayer in ix, 4-19, as pointed out by Gall, and some minor interpolations, and (5), the deutero-canonical parts written in Aramaic before the end of the 2d century. Even strong defenders of the traditional view, like Zöckler (1869), Myrberg (*Bibelforskaren*, 1894), Thompson (1897), and Wright (1906) have looked upon xi as an interpolation or an expansion of the original text.

Among scholars maintaining the unity of the book it has generally been held until recent times that both the Hebrew and the Aramaic parts were written by Daniel. This opinion has been defended, with learning and acuteness, by Hengstenberg, Hävernick, Pusey, Keil, Auberlen, Hebberlynck, Cornely, Wright and Wilson. Certain peculiarities, however, aroused doubts and questions already in antiquity, and in the last century many Protestant, Jewish and Catholic scholars have been led to assign it as a whole to a later age. The Talmudic statement that Daniel was written by the men of the great synagogue “Baba bathra” 15a, still remains obscure, but some kind of editorial activity is probably meant. Celsus (c. 178 A.D.) obviously did not believe in the story of Daniel in the lions' den or that it was told by the prophet himself, Origen, ‘c. Celsum’ vii, 53, 57; and even among Christians there seem to have been some doubts on this point in the time of Hippolytus, ‘Com.’ iii, 29, 4. Porphyry in the 3d century was forced to the conclusion that the author lived in the time of Antiochus IV. His opinions, set forth in the 12th book of his lost ‘Treatise against the Christians,’ were frequently quoted, sometimes with approval, by Jerome, who rejected the main thesis, but remarked, “if this is said concerning Antiochus, what harm can it do to our religion?” Isidore of Seville (d. 632) declared that Daniel and Ezekiel were written “by some wise men,” ‘Orig.’ vi, 2. According to Maldonatus (1611), some Manichæans (Paulicians) and Anabaptists rejected the authenticity of Daniel; Tiziano was accused at Coira in 1547 of regarding some parts of the Prophets as spurious, Comba, ‘I nostri protestanti’ (II, 487, f. 1897). Uriel da Costa in 1624 maintained, in a lost work, that the book was written by some Pharisee in the Maccabæan period. Hobbes, ‘Leviathan’ (1651), only threw out the hint that Daniel and other early books may have received their present form after the exile, perhaps through Ezra. But Anthony Collins, ‘The Scheme of Literal Prophecy Considered’ (1727), presented a solid array of arguments for a Maccabæan origin of the book; full justice has not yet been done to the scientific character of his reasoning. Corrodi (1781) regarded the work as made up of unconnected fragments written by an author living in the Maccabæan age to which extensive additions and changes were subsequently made. Bleek (*Theol. Zeitschrift*, 1822) urged against Eichhorn and Bertholdt the unity of the book and the Maccabæan origin of all its contents. This has become the view of a great majority of critics. Like Volney, Havet, ‘Le Christianisme et ses origines’ (1878), thought of the Roman period, and he supposed that the author depicted Herod the Great under the guise of Antiochus IV. Among those who reject the unity, the visions are as a rule assigned to the Maccabæan period, Lagarde and Hertlein being the chief exceptions.

The leading arguments for a later origin of the entire book than the exile, and for a Maccabæan date of the visions of Daniel are (1) the position of the book in the Hebrew canon; (2) the omission of Daniel's name in Ecclesiasticus xlix; (3) the occurrence of Persian and Greek words and later forms of names; (4) the mention of the Chaldæans as a priestly class; (5) the reflection upon the 70 years exile; (6) the use of the West Aramaic; (7) the absence of any acquaintance with the book before the 2d century B.C.; (8) later theological ideas; (9) the peculiar survey of history, involving seemingly erroneous ideas of the earlier period, remarkable familiarity with Antiochus IV and his immediate successors, but a mistaken notion as to the end of this king's reign; and (10) the apparent significance of the image, the four beasts, the “one like a son of man,” the little horn, and the 70 weeks. These arguments are not all of equal weight. Thus we know something about early critical opinions as to the status of sacred books, but as yet nothing with certainty concerning the time and manner of their acceptance for public reading. The silence of the author of Ecclesiasticus xlix (see ECCLESIASTICUS) in regard to Ezra is even more remarkable than his omission of Daniel; Joseph is clearly an afterthought and his services to Israel may have seemed greater than Daniel's. Persian and Greek words are not likely to have been used in Babylon at the time of the exile; the spelling of Nebuchadnezzar for Nebuchadrezzar may be due to a copyist; it is not known when the names of foreign gods began to be changed (Abed Nego for Abed Nebo, Shadrak for Marduk, Mishak for Nusku). There is a possibility that *galdu* or *kaldu* was the name of a priestly class (Cf. *Yale Oriental Series*, 66ff, 1915), but the Hebrew *Kasdim* seems to be connected, not with *Kaldu*, but with *Kashdu*, the Babylonian name for the Chaldæan people. It is not easy to see why Daniel should have sought for a new interpretation of the 70 years before the 70-year period was up. The use of West Aramaic, if original, favors Palestine as a place of composition. While there appears to be no trace of Danielic ideas in the Jewish writers after the exile, it is not certain that any of them had a natural occasion for referring to them. The advanced angelology does not with certainty show Zoroastrian influence, but the doctrine of a resurrection is probably of Persian origin. The direction in prayer, fasting as a preparation for a revelation, and a rigid observance of dietary rules are not necessarily signs of a later age; and the reference to “the books” only shows that some kind of a collection of sacred writings existed.

Neither Jeremiah nor the author of Kings knows anything about a capture of Jerusalem and deportation of Jehoiakim in 606 B.C. In 2 Chron. xxxvi, 6, however, Nebuchadnezzar is said to have deported Jehoiakim and carried away some of the sacred vessels to Babylon, though the year is not indicated. But Jer. xxxvi, 1 seems to preclude such a deportation in the third year of Jehoiakim. Belshazzar (Bel-shar-uzzur) was not a son of Nebuchadnezzar, but of Nabunaid, and there is no evidence that he was ever king of Babylon; but he is mentioned together with his father, commanded an army and may have been killed defending a part of the city after Babylon had been delivered over to Cyrus. History knows nothing of a Darius the Mede. He was for many centuries identified with Cyaxares, son of Astyages, known only through Xenophon's 'Cyropædia.' Xenophon nowhere suggests that Cyaxares had the name of Darius, or was made king of Babylon. He speaks of the part taken by Gobryas in the occupation of Babylon, and this has been verified by the inscriptions (cp. Scheil, *Revue d'assyriologie,* p. 165, 1914). But he is not said to have been made king of Babylon, or to have taken the name Darius, and he is distinctly declared to be a native Babylonian. Winckler, 'Altorientalische Forschungen' (II, 214ff, 1899), assumed that Cambyses was Darius the Mede, and that he was made king of Babylon by his father in 538 B.C., and the suggestion has been carried out more fully by Boutflower (*Journal of Theological Studies,* 1915). But it is not yet certain whether it was in 538 or 530 that Cambyses was king of Babylon. Darius the Mede, son of Xerxes, seems to be a reflection of Darius Hystaspis, father of Xerxes, as was seen by Marianus Scotus in the 13th century. It has even been plausibly suggested by Lagrange (*Revue biblique,* 1896) that his name may not have occurred at all in the original text. In xi, 1, the Greek has Cyrus; ix, 1, looks like a late editorial superscription; and in v, 30, the Greek reads, "the kingdom was taken away from the Chaldæans and given to the Medes and the Persians." It is not distinctly stated in xi, 2, that there would be only four Persian kings; from the biblical books the author is likely to have known of others, and it is not probable that vii, 6, refers to Persia. Of the four kingdoms there have been six leading interpretations. They have been held to be: I, Those of (1) Babylonia, (2) Media and Persia, (3) Alexander and (4) the Seleucids (Porphyry and many modern scholars); II, those of (1) Babylonia, (2) Media, (3) Persia and (4) Alexander and his successors (Ephraim, the annotator of the Syriac text in the Paris polyglot, and many modern scholars); III, those of (1) Babylonia, (2) Media and Persia, (3) Alexander and his successors and (4) Rome (Hippolytus, Jerome, Theodoret and many modern scholars); IV, those of (1) Babylonia, (2) Media and Persia, (3) Alexander and his successors, and (4) Rome and Islam (Jephet the Karaite, Ibn Ezra, Saadia the Italian, Rashi and others); V, those of (1) Babylonia, (2) Media and Persia, (3) Alexander and his successors, and (4) Rome and the Papacy (Paulicians, Albigenses, Fratricelli, Luther and others); and VI, those of (1) Babylonians, (2) Medians and Persians, (3) Alexander and his successors, and (4) Rome and 10 kingdoms growing up within the Roman Empire (Mede, Rule, Auberlen and others). The first is most probable, but the second also recognizes Antiochus IV as the little horn. Against the third must be urged the impossibility of fitting the description to the career of Vespasian, and the difficulty of removing ii from the earlier book and viii from the latter. It was clearly the desire to find references to contemporary events that caused a search for the Moslem world power, the ecclesiastical empire of Rome, and the 10-kingdomed confederacy of European states. The one "like a son of man" was long understood as the Messiah. As in the explanation the place of the man-like figure is taken by the saints of the Most High, many interpreters have understood Israel to be meant. It is probable that the figure represents Michael, who stands for the Jewish people, as Schmidt has suggested, with the approval of Bertholet, Marti, Porter and Kent. In ix the 70 years are explained as 70 weeks of years. The oracle is evidently Jer. xxx, 18; the "anointed prince" in vs. 25, as was seen by Hippolytus, is Joshua ben Jozadak; the cessation of the legitimate high priesthood in 171 B.C. seems to be intended in vs. 26; and the desecration of the temple by Antiochus IV in 168 by the erection of an altar and image of Baal Shamen (Zeus Olympius) is clearly meant in vs. 27. In Talmudic times Agrippa II was looked upon as the "anointed prince." Christians naturally saw a reference to the death of Christ. Many students, counting backward from the death of Jesus, assumed that the word went forth in 458 or 445 B.C., and that the last week extended from the Crucifixion to the destruction of Jerusalem in 70 A.D. Already Julius Hilarianus (397) objected to starting the 490-year period 100 years after Daniel and insisted upon the last week being seven years ending 164 B.C. Most modern scholars divide the weeks of years into six from 586 to 537, 62 from 537 to 171, and 1 from 171 to 164. The second period should be 434 years, and is, therefore, 66 years too short. Lacking a fixed chronology before the Seleucid Era, both Demetrius and Josephus made this period several decades too long, as Schürer has pointed out ('Geschichte des jüdischen Volkes,' IV, (1909). Cornill has suggested that the author may have counted 12 generations of high priests, giving each an average of 40 years.

It is assumed by many scholars that the author of the stories derived his material partly from biblical sources, partly from legends of foreign origin. The figure of Daniel, extant in post-exilic tradition, seems to have been enriched by reminiscences of Joseph, who also was carried away to a strange land, falsely accused, distinguished as an interpreter of dreams and exalted to be a ruler of the country; of Moses, who was educated at a foreign court, excelled the native magicians and uttered prophecies of doom against a powerful king; of Jeremiah, who was rescued from certain death in a den; of Nehemiah, who held a high position at the Persian court, and possibly of Mordecai, who was exalted by Xerxes. The tale of Achikar, supposed to have been a vizier of several Assyrian kings, was read by the Jews of Elephantine in the 5th century, and may have been known in Palestine. Stories of huge idols, of religious festivals, of Belshazzar's death at the time of a feast, of the devices of astrologers, of punishment by fire, and of lions kept for the hunt in cages or enclosures, may have become a part of Palestinian folk-lore. The conception of successive ages, represented by different metals, as in Hesiod, the use as symbols of various animals and monsters so frequently found among the sculptures and paintings of the pagan world, the adaptation of myths like that of Marduk and Tiamat and other conflicts of heavenly beings, and even speculation on significant numbers, may have been due to foreign contact.

The stories were eminently suited to inspire endurance and hope in the midst of a terrible persecution, while the visions created a keen expectation of the immediate end of the foreign tyranny and the founding of an imperishable Jewish kingdom. In every later crisis the book has tended to foster the same eschatological mood. The succession of four empires to be followed by the kingdom of heaven became a deeply rooted idea. It dominated the conception of history until the 16th century when the division into ancient, mediæval and modern history began to be advocated. The faith that surveyed the passing of empires and looked with intense longing for the kingdom of heaven on earth gave to this book a power which it still possesses to kindle fresh hopes for the overthrowing of oppressive world-powers and the establishment of a nobler order of things.

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DANIEL DERONDA, George Eliot's last novel, considered by some critics her greatest work. Deronda was brought up in ignorance of his Jewish parentage, but ultimately cast in his lot with his own people. The influence of Deronda remolds the character of the heroine, Gwendolen Harleth, who is unhappily married to Grandcourt. In 'Daniel Deronda' George Eliot had three objects in view: (1) To show the influence of heredity; (2) to show that ideals and sentiments lie at the basis of religion; (3) to contrast a social life founded on tradition (that of the Jews) with mere individualism. The novel was first published as a whole in 1877.

DANIELL, John Frederick, English scientist: b. London, 12 March 1790; d. 13 March 1845. He was elected a Fellow of the Royal Society in 1814, and devoted himself to chemistry and meteorology. In 1823 he published his 'Meteorological Essays'; and in 1831 was appointed professor of chemistry in King's College, London; and in 1839 published his 'Introduction to Chemical Philosophy.' In 1843 he received the degree of D.C.L. from the University of Oxford and obtained all the three medals in the gift of the Royal Society. He invented a hygrometer (1820), and a new pyrometer (1830), as well as the electric battery known by his name; and he wrote many valuable papers on chemistry, especially on voltaic combinations and electrolysis.

DANIELL, Samuel, English artist and traveler: b. London 1777; d. Ceylon 1811. He was a brother of William Daniell (q.v.). He spent three years at the Cape of Good Hope, and afterward proceeded to the interior of Africa, making sketches of the scenery and people, which he brought home with him to England in 1804, when they were published, with an account of the animals of southern Africa. He afterward went to the island of Ceylon, and during a residence of six years collected a large amount of similar materials, one volume of which was published, with a description of that country and its inhabitants, in 1808.

DANIELL, Thomas, English landscape painter and engraver: b. 1749; d. London 1840. In company with his nephew, William Daniell (q.v.), he made an extraordinary journey through India, for the purpose of preparing sketches and illustrations of the scenery, which were afterward published with the title 'Oriental Scenery' (1808). He was originally a heraldry painter, and became Fellow of the Royal, Asiatic and Antiquarian societies. He published also 'Views in Egypt'; 'Hindu Excavations at Ellora'; 'Picturesque Voyage to China by Way of India' (1817).

DANIELL, William, English painter and engraver: b. 1769; d. 1837. He set out at the age of 14, in company with his uncle, Thomas Daniell (q.v.), upon an artistic exploration of the peninsula of Hindustan. They began their journey at Cape Comorin, and sketched almost everything beautiful or interesting in the country between that point and Serinagur, in the Himalaya Mountains. They were occupied 10 years in this undertaking. Of their immense number of sketches, they selected and published a portion in a great work entitled 'Oriental Scenery' (1808). William also published 'A Picturesque Voyage to India'; 'Zoography';

'Animated Nature,' etc., and from 1814 to 1825 was engaged in making sketches for 'A Voyage round Great Britain.'

DANIELS, Cora Linn, American author: b. Lowell, Mass., 17 March 1852; married Joseph H. Daniels 1871. She has written much for the press and has published in book form: 'Sardia' (1892); 'As it is To Be: Psychical Philosophy' (1892–1900); 'The Nurse'; 'Omar Khayyam'; 'The Bronze Buddha' (1899); 'Encyclopedia of Superstitions of the World' (1901). Mrs. Daniels' recent work has been trade letters to the press from Europe and many poems, soon to be collected into a volume.

DANIELS, Fred Harris, American mechanical engineer: b. Hanover Centre, N. H., 16 June 1853; d. 30 Aug. 1913. He was educated at the Worcester Polytechnic Institute and made a special study of iron and steel manufactures during a tour in Europe. In 1873 he became connected with Washburn, Moen and Company and was at one time general superintendent. He remained as chief engineer when this firm was merged with the American Steel and Wire Company in 1899 and after the merger with the United States Steel Corporation in 1901 he was made chairman of the board of engineers. He owned over 150 patents relating to the iron and steel industry, especially the manufacture of wire rods.

DANIELS, Josephus, American public official: b. Washington, N. C., 18 May 1862. He received an academic education at the Wilson Collegiate Institute and at the age of 18 became editor of the Wilson (N. C.) *Advance.* In 1885 he was admitted to the bar but did not practise. In 1887–93 he was State printer for North Carolina, and chief clerk of the Department of the Interior from 1893 to 1895. In 1885 he became editor of the Raleigh (N. C.) *State Chronicle,* which journal he consolidated in 1894 in the *North Carolinian,* with a weekly edition known as the *News and Observer,* of which he has since been editor. He took an active interest in politics, both State and national, and in 1912 was publicity manager for the Wilson forces. He served as member of the Democratic National Committee after 1896. He became Secretary of the Navy in President Wilson's Cabinet and in this post greatly improved the condition of the enlisted personnel of the navy, established courses for the instruction of the men in various trades, and banished alcoholic liquors from the officers' mess. His advocacy of a greater navy did much to bring the United States naval forces to a high point of efficiency on its entrance into the great conflict in April 1917.

DANIELS, William Haven, American author: b. Franklin, Mass., 18 May 1836. After studies at Wesleyan University and travel in Europe, in 1866 he became librarian in Northwestern University, and in 1868–69 was professor of rhetoric in Illinois Wesleyan University. From 1869 to 1876 he served in the Methodist ministry. He published: 'That Boy: Who Shall Have Him'? (1878); 'The Temperance Reform and Its Great Reformers' (1878); 'Moody, His Words, Work and Workers' (1879); 'Illustrated History of Methodism in the United States' (1880); 'A Short History of the People Called Methodists' (1882).

DANIELS, Winthrop More, American political economist: b. Dayton, Ohio, 30 Sept. 1867. He was educated at Princeton where he was graduated in 1888, and afterward spent one year at the University of Leipzig. He was professor of political economy at Princeton from 1892 to 1911, when he became a member of the board of utility commissioners of New Jersey. In 1914 he was made a member of the Interstate Commerce Commission. He was meanwhile on the contributing staff of the New York *Evening Post.* He has published 'Revision and Continuation of Alexander Johnston's History of the United States' (1897); 'Elements of Public Finance' (1899); 'Continuation of Johnston's History of American Politics' (1902), and contributions to periodicals.

DANIELSON, Conn., borough in Windham County, on the New York, New Haven and Hartford Railroad and the Quinebaug River, 25 miles northeast of Norwich. Cotton manufacturing is the principal occupation and industry of the inhabitants. Pop. 2,934.

DANISH EAST INDIA COMPANY. See East India Companies.

DANISH LANGUAGE. The Danish language belongs to the Scandinavian group of the Germanic languages. This group comprises, in modern times, besides the language already mentioned, the Dano-Norwegian, the Norwegian Landsmaal, the Swedish, the Icelandic and the Faroish languages.

The earliest specimens, still preserved, of the primitive Scandinavian language (Urnordisk), soon after the beginning of the Christian era, are *loan* words in Finnish (and Lappish), several hundred in number, mostly denoting utensils belonging to a fairly advanced stage of civilization. In the Scandinavian countries themselves the earliest specimens of Urnordisk are the inscriptions in the early Runic characters, 24 in number, developed from the Latin and Greek alphabets and known to all Germanic peoples. There are over 100 of these early Runic inscriptions. Some of these are the oldest existing traces of any Germanic tongue and closer than any other to what is supposed to have been the original primitive Germanic language. From these early specimens that have been preserved we learn then that the Urnordisk belongs to the Germanic (Teutonic) group of the Indo-European family, and is an independent and individual branch, most nearly related to the Gothic. The most famous old Runic inscription found in Denmark is the inscription on the Golden Horn, found in 1734 and lost in 1802: 'Ek hlewagastir holtinar horna tawido' (I Lagest from Holte (Holt's son) the horn made). The Norwegian Professor Sophus Bugge and the Danish Professor Ludvig Wimmer were the first scholars able to interpret these Runic inscriptions, of which some, however, have as yet not been interpreted. During the Viking Age (750–1000 A.D.) the language of the Scandinavian nations, as evidenced in the Runic inscriptions in the later, peculiarly Scandinavian, Runic characters (16 in number), underwent a very decided change. The Scandinavian peculiarities distinguishing the language from the other Germanic idioms now appear fully developed, and by and by even dialectal differences between the languages of the several Scandinavian nations commence to assert themselves. The principal changes from Urnordisk are: (1) dropping unaccented vowels, (2) introducing vowel harmony (i-and u- mutation), (3) assimilation of consonants. Toward the close of this period the dialectic differences establish two groups: Norwegian-Icelandic (western group) and Danish-Swedish (eastern group). In the eastern group there are fewer cases of u-umlaut, not as many assimilations, the simplicity of verb inflections is much further advanced, the passive ends in s, while in the western group it ends in sk. The differences, however, are still unimportant, and the Scandinavians themselves consider their language as one (Danish tongue.) Generally speaking, the western group has preserved the more primitive forms. As an example of old Danish from this period may be cited the inscription on one of the 200 runestones found in Denmark, the smaller Jellinge-stone: “Gormr konungr gærdi kumble p Φ si æft pyrwi konu sina, Danmarkar bot” (King Gorm made this mound [with runestone], after his wife, Tyra Danebod).

Danish in the Middle Ages (1050–1500).— It is only after the introduction of Christianity (about 1000 A.D.) that real literature is made possible. The monks brought with them the art of writing, and literary activity in the Middle Ages is especially connected with the churches and monasteries. The Latin alphabet was introduced, but sometimes, especially in Iceland, characters denoting peculiar Scandinavian sounds were added. The Norwegian-Icelandic literature from the earlier Middle Ages stands, both as to extent, age and value, far above the Danish and Swedish, and the language of the oldest Norwegian-Icelandic manuscripts varies only a little from the Runic language of about 1000 and has greater linguistic interest. The earliest preserved Danish manuscripts date from the close of the 13th century. From 1050–1250 Danish language is known only from rare Runic inscriptions and from Latin manuscripts with Danish names. The oldest manuscripts with Danish words contain the old Provincial Laws. They show that the separation from the original common Scandinavian idiom, already indicated in the younger Runic inscriptions, now is strongly apparent. Old Danish (1050) was an old Scandinavian dialect, middle Danish (1300) is an independent language which has diverged far from the original idiom and also from the western Scandinavian language, and now is on the point of parting company with Swedish. In the Middle Ages (and later) Danish was spoken also in Sleswick and in Scania, Halland and Blekinge (now belonging to Sweden.) There were three groups of popular dialects, those of Scania, Zealand and Jutland. But already the earlier manuscripts show a tendency toward creating a uniform Danish literary language, and this is gradually developing essentially from the Zealand dialect. In this period some of the changes to be noticed are: A large number of Low German words are introduced, especially in the 14th and 15th centuries, when the Hanseatic League controlled the commerce of Denmark, and also the political influence from Germany was very considerable. Most of these words have been retained and are later considered pure Danish. Many German derivational endings were adopted and often added to native words. Of German prefixes adopted were be-, for-, und-. The declension of nouns, adjectives and pronouns was greatly simplified. Instead of the original four cases only two, nominative and genitive, were ordinarily used (in pronouns also the objective form). The original three genders (retained in most dialects) were reduced to two, common and neuter, in the literary language. In western Jutland only one, the common gender, was used. The use of prepositions is developed more and more. The order of the words in the sentence, to show the syntactical connection, becomes more fixed. Already from the 10th century the monophongification of original diphthongs was observed in the eastern group of Scandinavian languages (Danish and Swedish), Stein became sten, daudr-dödr, leysa-lösa. The language of Norway, on the other hand, with the dialects spoken in the countries settled from or belonging to Norway, Iceland, the Faroe Islands, Greenland, the islands north and west of Scotland, retained the old diphthongs as diphthongs. About 1300 the Danish language began to substitute voiced stops (mediæ) for voiceless stops (tenues or hard consonants) after a long vowel at the end of a word or a syllable. The Swedish retained the old voiceless stops. K, t, p were changed to g, d, v. Swedish rike = D. righæ, S. låta = D. ladhe, S. dräpa = D. dræwæ. About 1300 also the glottal catch, so peculiar to Danish pronunciation, was introduced. The earlier Danish ju (retained in Swedish) is changed into y.

Danish (1500–1900).— With the 15th century a new period in the history of the Danish language takes its beginning. With the introduction of the art of printing (1482) many books were brought into circulation. The most important work of the Danish Reformation is Christian III's Bible, translated by Christian Pedersen and others. In this translation the authors made an effort to establish a consistent orthography and to avoid double forms. It has had great influence on the literary, particularly the church, language of later times. Of other works marked by their comparatively pure Danish may be noted A. S. Vedel's translation of Saxo (1575), Klaus Lyskander's (1558–1623), ‘Danske Kongers Slœgtebog,’ a kind of genealogy of Danish kings. The following period down to Holberg (1684–1754) produced few works written in good Danish. Best known are Thomas Kingo's hymns and the works of the Norwegian preacher and poet Petter Dass. Of the greatest linguistic importance is Christian V's ‘Danish Law’ (1683). During the humanistic ascendency, the literature was strongly marked by Latin-German influence. Almost all the learned men of the period wrote in Latin. Many Latin and High German words were adopted. From German were now introduced the prefixes er- and ge-. During the latter half of the 16th century, German was the official language of Sleswick and also to a great extent in Denmark proper. Later French exerted great influence, especially in court circles. Even the great author and linguist Holberg, who taught the people to respect their mother tongue, shows foreign influence. About 1750 arises a movement against foreign influence. The most prominent representatives of this movement are Eilschow (1747) and Sneedorf and his periodical “Den Patriotiske Tilskuer” (1761–63). From Sneedorf and his school the modern Danish prose may be said to have its origin. Before 1800 only Ewald and Baggesen are really great masters of prose style. But it is only from 1840, beginning with such masters as H. C. Andersen, Goldschmidt, Kierkegaard and continuing with numerous writers and authors of fiction, of critics, political writers, historians that Danish prose has developed to the degree of perfection it now has. Many writers of poetry have attained the same efficiency in the use of the Danish language. The vocabulary has been enriched by adopting many words from the early Scandinavian literature, from the dialects and from the speech of the people. The grammar has been simplified. Uniform orthography was officially established in 1889.

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DANISH LITERATURE. Danish history may properly be divided into three epochs: The heathen age, from the earliest times to 1000; midde age, 1000–1500; modern age, 1500 to the present. Apart from the Runic inscriptions, no literature originating in the first period has been preserved. Great Danish scholars as Rask, one of the founders of comparative philology, Thomsen, Steenstrup, Worsaae, Sophus Müller, Olrik and others have shown that great epics had their origin among the Danes from the time of the migrations to the close of this period, the golden age of Danish heroic poetry. We find traces of them in Saxo, in the Norwegian-Icelandic sagas, in English sources. In the Middle Ages a written literature first arises by reason of the practical needs of the Catholic church, especially after the establishment of the archiepiscopal seat at Lund (1104). The language used is Latin. The first book written in Denmark was a brief history in Latin of Saint Canute. The author was the English monk Ænoth who was a preacher in Odense shortly after 1100. Many Danes had studied in Paris and other places and were well versed in the scholastic learning of the times. Of these, Anders Sunesön, Archbishop at Lund (1201–1222), who had been a professor in Paris, wrote in Latin hexameters 'Hexaëmeron,' describing the creation of the world in six days and also containing scholastic comments on doctrines of the church. In the age of the Valdemars (1150–1250) Denmark reached her highest point of power and culture. The great *Absalon* is the central figure. At his instigation the history of Denmark was written, a very brief 'Historia regum Daniæ' by Sven Aageson and 'Gesta Danorum' (in 16 books) by Saxo. In spite of their Latin form they reflect the national aspirations of Absalon and the great Valdemars. Saxo completed his famous work shortly after 1200. It is the greatest intellectual effort and the most important work of mediæval Denmark. The oldest books written in Danish are the Provincial Laws. The Scanian Law is from Valdemar the Great (1157–82). One of the manuscripts is the only Runic manuscript in existence. The Zealand Law is from the same time; the Jutland Law, the most important and interesting, was principally written by Bishop Gunner and promulgated in 1241 by Valdemar the Victorious. In Danish are also medical works written by Henrik Harpestreng (d. 1244). In the 15th century appeared Peder Laale's Proverbs in Latin and Danish. Toward the close of the Middle Ages we have the Danish Rhyme Chronicle, the first Danish book printed (1495). The kings are introduced in chronological order, and each relates his own story, which includes even his death and burial. But more important than the written literature is the Danish ballad. In the Middle Ages, the popular ballad flourished in all the Scandinavian countries, and especially in Denmark from the grand age of the Valdemars. Denmark alone has over 500 original ballads, while the variants number several thousand. The first printed collection (of 100 ballads) appeared in 1591 and was edited by A. S. Vedel. Before his time ladies of the nobility had copied many of them. But they continued to enjoy a vigorous life on the lips of the people until they finally were collected in the 19th century. The main critical edition is by Svend Grundtvig (5 vols.); this edition was continued by Axel Olrik (d. 1917) who published three additional volumes and also a selection of ballads with an excellent introduction. The popular ballad originated among the nobility or higher classes in connection with the dance, introduced into the Scandinavian countries in the 12th century.

In the ballads may be traced many relics of old, mythological beliefs and there may be found many themes of former ages, so they, in a manner, preserve the connection between the spiritual life of past ages and the national renaissance of times that follow. But they also paint pictures of the life of chivalry, of the doings of the common people, of moral aspects and customs. In vigorous descriptions they show us life when not «the monk» but «the knight» was the centre of attraction. They supply the lack of a more complete national history and poetic activity. There are songs of magic and miracle, ballads relating to historical persons and numerous ballads of chivalry.

Modern Denmark.— The revolution in the mode and view of life which characterizes the transition from the Middle Ages to the Modern period has been treated fully by the Danish Professor Troels-Lund in his great work, 'Dagligt Liv Norden.' In Denmark the religious life was mostly affected. The time of the Reformation signifies principally opposition to the Catholic church and to the scholastic way of thinking. The religious liberation spread rapidly from Germany to the Scandinavian countries, while the effects of the renaissance came later. The literature of the Reformation period (16th century) shows very little originality, but has its great national significance by being written in the mother tongue, the principal condition for having an independent literature. After the struggle about the new creed, it looked as if a really liberal view would win in all lines. New science arose, the educational system was improved, the University of Copenhagen (founded 1479) was re-established in 1537, much work was done to have the history of Denmark written, the higher classes, including the court and the nobility, took much interest in art and science. But soon all interest centred in the establishment of the «pure» Lutheran doctrine, theology itself became learned and made use, as the other sciences, of the Latin language; censorship was established and checked all free literary development. It became Holberg's great mission to raise the people by making them acquainted with the progress made by the leading countries of Europe.

In the age of Reformation proper, Kristiern Pedersen (1480–1554), called «the father of Danish literature,» was one of the leaders. His use of the Zealand dialect became the foundation of the literary language of the country. His translation of the New Testament was published in 1529, and the translation of Christian III's Bible (1550) is in the main his work. He also published a free adaptation of a book by Luther on how children should be kept in school. Hans Tausen (1494–1561) by his eloquence and with his pen contributed most to the reformation in Denmark. Peder Palladius (1503–60), Zealand's first evangelical bishop (superintendent), edited a number of books in Danish and Latin to advance the cause of general education and morality. His most important work is his ‹Vistatsbog,› a collection of addresses delivered on his professional visits through his bishopric. It gives a vivid picture both of the able and imperious bishop himself and of the times. Povel Helgesen was the first to oppose the sale of indulgences, even anticipating Luther himself, but later attacked the Lutherans for going too far in their attack on the Roman church. They called him Povel «Turncoat.» His polemical writings show the excellent style of this great humanist. His ‹Skiby Chronicles› is the only historical work of importance from that time. Hymn writers were Hans Kristensen Sthen and Hans Thomesen, who published (1569) the first authorized hymn-book, which contained the best of the earlier hymns and very good contributions by himself.

The Period of Learning (1560–1700).— The majority of the writers of this period had no longer any use for the people and the vernacular. They returned to «the language of the gods,» Latin, and subtle theological discourses and treatises now succeeded the religious revival of the people. Melanchton's disciple, Niels Hemmingsen (1513–1600), is the greatest theologian of the time. He published a number of highly valued commentaries on the New Testament, a great dogmatic work and also text books for the use of pastors. His fame spread over the whole of Europe and he received the cognomen «The Teacher of Denmark.» With his ‹De lege naturæ› he became the forerunner of the founders of «natural law,» Grotius and Pufendorf. Because his views differed from the established orthodoxy he was discharged from the university. Jesper Brochmand (1585–1682), Bishop of Zealand, was the most learned theologian of Denmark in the 17th century and the orthodox leader who exercised a decisive influence on his epoch. On his ‹Universæ Theologiæ Schema› is based his reputation in the whole Lutheran church, while his Danish ‹Postil,› translated into several languages, has been popular down to our days. It was a time characterized by trials of witches, bigotry and superstition, and both theologians and scientists showed the prejudices of the times. A number of men with much book learning brought together a wealth of material in various sciences without much critical elaboration. Within the field of empirical sciences, especially medicine and astronomy, Denmark had at this time several men of world renown. Tyge Brahe (1546–1601), a member of one of the oldest noble families, was an astronomer. Kaspar Bartholin and his son Thomas (1616–80) were great anatomists. Ole Borch, also a polyhistor, excelled in chemistry and Latin. Simon Paulli, also much interested in botany, established (1644) the Domus Anatomica in Copenhagen. Most famous, perhaps, was Niels Steensen (Nicolaus Steno, 1638–86), who made great discoveries in anatomy and founded the science of geology. Ole Römer, the astronomer, gained for himself great celebrity by his scientific discoveries. His calculation of the velocity of light (1675) marked a new area in scientific research. Of interest is the fact that men and women of the old Danish nobility distinguished themselves in science and literature. Holger Rosenkrans was considered one of the best theologians of the time. Noble ladies made collections of popular ballads, many of them were learned and devoted to studies. Noblemen were liberal patrons of the arts and sciences. Arild Huitfeldr published in ten volumes a chronicle of the Danish kingdom. Under the influence of German-Dutch renaissance and also, after absolutism was established (1660), of French classicism, what was of Danish native origin was more or less despised. But there also flowed through the period a national and to some extent a popular current, which was not very strong but is of great interest as a continuation of the great popular movement created by the Reformation. Anders S. Vedel (1542–1616) published his excellent translation of ‹Saxo› in 1575 and his selection of Danish ballads in 1591. Of Norwegian writers who after the Reformation and until 1814 belong to Danish literature, Peder Claussön Friis translated ‹Snorre› and wrote his ‹Description of Norway,› both works printed after his death. Anders Arreboe (1587–1637) translated the Psalms of David and wrote ‹Hexaëmeron,› partly in hexameters and partly in alexandrines, according to the rules laid down by Opitz in his ‹Prosodia Germania.› The poem is a free imitation of the French poem by Bartas, but many parts are original. Peder Syv published the first grammar in Danish (1685); Erik Pontoppidan also wrote a Danish grammar in Latin. Ole Worm, with his ‹Monumenta Danica› (1643), is the founder of Danish runology and archæology, and awakened an interest in the study of the early Scandinavian (Norwegian-Icelandic) literature. Mathias Moth left in manuscript rich collections which were used in the compilation of a voluminous Danish dictionary. The most important Danish prose works of the period are, besides Christian V's 'Danish Law,' Birgitte Thott's translation of 'Seneca' and Leonore Christine's 'Jammersminde,' in which this daughter of Christian IV in simple and touching language describes her long sufferings in prison. Anders Bording (1619–77) enjoyed a great reputation as a poet and possessed great skill in versification. The Norwegian Petter Dass (1647–1708), for many years pastor in Nordland in the north of Norway, wrote in lively anapæsts with tuneful rhyme his 'Nordlands Trompet' in glorification of the scenery and life of his beloved native region. He turned the catechism and Bible into verse adapted to singing, in plain and simple language. He gained an immense popularity. Bishop Thomas Kingo (1634–1703) is the greatest poet of the period and one of the greatest psalmists. Many of his hymns still remain unsurpassed. In this field he showed that «the spirit of the Danes can rise as high toward heaven as that of other nations.»

The Norwegian Ludvig Holberg (1684–1754) is by far the most prominent figure of the next period. After years of study and travel, he became a professor at the University of Copenhagen. He was strongly influenced by English and French ideas (especially by Locke and Bayle), but also national and independent in his conception and application of what he had learned. He was well equipped for the mission he had chosen for himself. He attacks the worthless traditions of the past and exposes to the light the dark sides of his times, but he also builds up by creating a rich and many-sided literature in his country in all the fields within reach of his far-seeing and clear intelligence. His literary production is enormous and embraces history, philosophy, poems, satires and comedies. In more than 500 Danish 'Epistles' he discusses all burning questions. His lively prose created a rich literary language out of the hitherto uncultivated Danish tongue. This was also his aim of which he was fully conscious. He wrote in order «to polish the language.» But he had also an ethical object in view. He wanted to inculcate his own tolerant views, his own healthy common sense. He became in truth the intellectual father of posterity. Holberg incorporated Denmark and Norway with contemporary Europe and left to the «twin nations,» as an imperishable inheritance, a modern literature, a modern stage, and a modern prose. In the age of Holberg lived H. A. Brorson who wrote his fervent and deeply touching hymns. Pontoppidan (the younger) published religious works and a description of Denmark. The poems of Ambrosius Stub show that love of nature still lived in Danish hearts. H. Gram started the critical study of history. J. Langebek edited a series of historical sources. «The Academy of Sciences» and «The Society for the Study of the Fatherland's Language and History» were established. One great philologist, Jens Höysgaard, lived at this time, but was only appreciated a long time afterward.

The latter half of the century (1750–1800) is called the «Age of Enlightenment,» characterized by the crossing of many new ideas and influences. English influence was shown when the Norwegian Tullin wrote his much admired 'Maidagen' in imitation of Thomson's 'Seasons.' Another Norwegian Nordahl Brun's tragedy 'Zarine' was fashioned after the French model, and the French was in the main the ruling influence, until a third Norwegian published his immortal travesty 'Love without Stockings,' which drowned it and all that class of plays in laughter. The principal author of the period, the Danish genius Johannes Ewald (1743–1781) owed much to German impulses, but broke with the old forms and in an epoch-making manner showed the way back to the early and heroic age of the Scandinavians.

Interesting on account of his wit and elegant language is the «poet of the graces» Jens Baggesen who belongs to the transition period between the old and the new of the 19th century. P. A. Heiberg's comedies are also to be mentioned. In this period were published a number of periodicals. The most important are Sneedorf's 'Den patriotiske Tilskuer,' Rahbek and Pram's 'Minerva' and Rahbeck's 'Den-danske Tilskuer.' The thing of importance was to teach, to moralize, to popularize. This is also, in the religious field, the idea of the so-called Rationalism whose representative was Bastholm, while Bishop Balle is the orthodox leader. The typical and influential writer in this age of «enlightenment» is, without comparison, K. L. Rahbek (1760–1830), influenced by the ideas of the French revolution. This influence appears even stronger in P. A. Heiberg and Malte Brun who ventured to discuss also political questions and are sent into exile. With the 19th century came a new spirit and a new literature. The romantic movement introduces the golden age of Danish literature. The first and most prominent name we meet is that of Adam Oehlenschläger (1779–1850), who almost at once was able to shape the new ideas to the national needs and created a peculiar Danish romanticism. He produced one work after another which crushed all opposition of the old school and established his fame on a firm basis. After his epoch-making 'Digte' (1803) he chanted the praise of the genius in his 'Aladdin' (1805) and in 1807 he published his first great tragedy 'Hakon Jarl'; Grundtvig (1783–1872), the greatest national leader in Denmark, was prominent as a vigorous writer and «skald,» a scholar, a preacher, a leader in church and education. Men of great talent, but less national and more influenced by German romanticism were Schack Staffeldt, Ingemann and Hauch. In the twenties, J. L. Heiberg (1791–1860) made an attack on the formlessness of the romanticists and championed the beautiful artistic form. In this he was supported by Henrik Hertz (1798–1870). Through both his literary and critical writings Heiberg exerted the greatest influence. The most prominent writers close to Heiberg were Hertz who handles a great variety of subjects with masterly skill, and his mother, Thomasine Gyllembourg, who writes about the higher circles in the capital with fine taste and keen psychological insight, and Christian Winther (1796–1876) who in his songs of nature and love reached higher than any before him. The only Danish writer known throughout the world, H. C. Andersen, and F. Paludan-Müller, one of the best by his depth of thought and fine form, were also originally of Heiberg's school. More independent positions have Steen St. Blicher who in pathetic and humorous tales gave a masterly description of the Jutland villagers, Poul M. Möller, a professor of philosophy, whose comparatively few poems are marked by an original and choice style, while a fresh humor is shown particularly in his unfinished story 'En Students Eventyr,' and Emil Aarestrup whose glowing poems show a marked individuality. In the forties much of the literature has a political errand. The poems of Ploug advocate the close union of the Scandinavian countries, sing the praises of the Constitution (1849) and the heroes and deeds of the First Sleswick war. Goldschmidt makes in his weekly 'Corsaren' scathing attacks on absolutism. The most popular writer of this time was J. C. Hostrup (1818–92) whose comedies are superior to Heiberg's in humor and knowledge of real life. Between 1850–70 a number of talents, though no great genius, appears. Kaalund and Richardt gain much new popularity by their lyrics, Bergsöe, H. F. Ewald and Carit Etlar as writers of stories. With the famous lectures of Georg Brandes (1871) a new period begins, that of Realism. While the old writers still continue in the old ways and some of the younger also associate themselves with them, the most prominent follow the lead of Brandes. The literature is filled with modern ideas and the style is new. In fiery poems Drachmann presents the revolutionary movements of the times, Schandorph introduces without any romantic embellishment his characters from country and city. J. P. Jacobsen from his view of life based on modern science paints his colorful pictures of the past and the present. As others of the same school may be mentioned Gjellerup and Pontoppiddan who shared the Nobel literary prize of 1917, H. Bang, G. Wied, Karl Larsen. In the eighties the French Beaudelaire and symbolists exerted great influence on lyric poets who then became known, S. Michaëlis, S. Clausson, J. Jörgensen, Stuckenberg and later H. Rode. Later this influence disappeared as in the poets V. Rördam, L. C. Nielsen, J. Aakjær. Among authors who have written stories of real life in new fields may be mentioned J. Knudsen, Skjoldborg and especially J. V. Jensen who is characterized by originality, great imagination and mastery of style.

In the 19th century Denmark produced a number of scholars of the highest rank. The greatest thinker this country has is Sören A. Kierkegaard (1813–55) whose theological and philosophical writings have exerted great influence. As noted writers on philosophical subjects may, in addition, be mentioned: Sibbern, R. Nielsen, Bröchner, Höffding, Kromann. Great historians are Allen, C. Paludan-Müller, Holm, A. D. Jörgensen, Erslev, Steenstrup, Troels-Lund. In philology are such names as Rask, Westergaard, Madvig, Verner, V. Thompsen, Wimmer, Nyrop. Famous scientists are Oersted, Schouw, Warming, Forchhammer, Schiödte, Steenstrup, J. Thomsen, Zeuthen, J. Petersen, Finsen.

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DANISH SOUND DUES, maritime taxes prior to 1857 imposed by Denmark on all vessels passing through the sounds connecting the North and the Baltic seas, based according to Danish interpretation, "upon immemorial prescription, sanctioned by a long succession of treaties with foreign powers." Contending that navigation of straits connecting open seas was free to all, the United States in 1826 had obtained a provisional 10-year treaty that "neither the vessels of the United States nor their cargoes shall, when they pass the Sound or the Belts, pay higher or other duties than those which are or may be paid by the most favored nation." In 1855 prior to the renewal of the treaty for the fourth time the United States emphasized the fact that it would not pay for the privilege of using the maritime highway connecting two seas, but was willing to contribute its share for the maintenance of the "lights, buoys and pilot establishments." These aids to navigation were adjudged at $393,011 by the treaty of 1857 with Denmark.

DANISH WEST INDIES. See Virgin Islands.

DANITES, dăn'īts, a former secret society of the Mormon Church, for militant action against its enemies. It was organized by Joseph Smith at Kirtland, Ohio, 30 March 1836, by a "covenant" to avenge any further expulsion of the Missouri Mormons by mobs; on the basis of a "revelation" of 6 Aug. 1833, justifying any Mormon in "rewarding thine enemy according to his works." The first name chosen was Daughters of Zion, from Micah iv, 13; this not seeming graphic, it was changed to Destroying Angels, or Flying Angels, the former used for many years; then the Big Fan (Jer. xv, 7 or Luke iii, 17); then Brothers of Gideon; finally Sons of Dan, turned by outsiders into Danites, from Gen. xlix, 17. A constitution was adopted, giving the executive power to the president of the Church and his counselors, and the legislative power to the same, with the generals and colonels of the society; this legislature to have power to "administer punishments to the guilty in accordance with the offense." The oath taken by the members was to obey the Prophet and First Presidency "in all things, the same as the supreme God"; to "stand by my brethren," and "uphold the presidency, right or wrong"; and invoking terrible punishments for revealing the secrets of the society. The Mormons have usually denied that the society existed, or if so that it was countenanced by the Church; and Smith's Nauvoo council denied its existence there. Brigham Young, however, boasted of its existence in Salt Lake City. Its actions, from the nature of the case, can only be inferred. It is usually credited with all the deeds of blood charged against the Mormons, including the Mountain Meadows massacre (q.v.). The name was attached by the Douglas Democrats to the administration (Buchanan) Democrats in the Lincoln-Douglas senatorial Illinois campaign of 1858, as an insinuation that they were Buchanan's tools in upholding the Utah Rebellion. Consult Ferris, ‹Utah and the Mormons› (New York 1854).

DANNECKER, dăn'nĕk-ĕr, **Johann Heinrich,** German sculptor: b. Waldenbach, near Stuttgart, 15 Oct. 1758; d. Stuttgart, 8 Dec. 1841. At the Karlsschule he devoted himself so successfully to sculpture that a statue of Milo of Crotona, executed in his 17th year, excited great admiration. On leaving he was appointed court sculptor, and three years after visited Paris and Rome. In the latter city he executed a Ceres and Bacchus, which procured him admission into the academies of Bologna and Milan. In 1790 he returned to Würtemberg, and became professor of the fine arts at Stuttgart. From this period he continued his professional labors with most brilliant success, and was patronized by the most distinguished personages in Germany. His acknowledged masterpiece is a statue of Christ, which occupied him during eight years, and the prototype of which is said to have been suggested to him in a dream. His ‹Ariadne seated on the Panther› is a splendid work, and in the opinion of some critics is superior as a work of art to his ‹Christ.› As a sculptor he occupies an intermediate place between Canova and Thorwaldsen, having blended in the happiest manner the spirited conception of the former with the latter's great anatomical skill, careful execution, and nice appreciation of nature. His ability to delineate character has made his busts famous. Among these are ‹Schiller› at Weimar, and kings Frederick and William at Würtemberg. Consult Radcliffe, ‹Schools and Masters of Sculpture› (1894).

DANNEMORA, N. Y., village in Clinton County; on the Chateaugay Railroad; 12 miles west of Plattsburg. Here is located one of the State prisons called Clinton State Prison. The iron ore found in the vicinity is of an excellent quality. Pop. 1,146.

DANNEMORA, dăn-nĕ-moo'rä, Sweden, a straggling village and mining field, 12,250 square metres in extent, on a lake of the same name, 24 miles northeast of Upsala, in the district of Upsala. It is celebrated for its iron mines, the second richest in Sweden, which have been worked uninterruptedly for upward of three centuries, and produce the finest iron in the world. The mine has been sunk more than 100 fathoms, and as part of the workings runs under the lake, great trouble is sometimes experienced in keeping out the water. The ore consists of 86 to 90 per cent magnetic oxide of iron, 7 to 12 per cent silica, and traces of manganese, lime, magnesia and alumina, the earthy matters being in the proportion to form a fusible slag without further addition. It is almost free from sulphur and phosphorus, and as the charcoal fuel employed in smelting is also free from these impurities, the Dannemora iron enjoys the highest reputation, and is in great demand for conversion into steel.

DANNREUTHER, dăn'roi-ter, **Edward,** English pianist and conductor: b. Strassburg, Germany, 4 Nov. 1844; d. 12 Feb. 1905. He was educated at Cincinnati, Ohio, studied music at Leipzig under Moscheles, and in 1863 went to London and lectured on Wagner, Bach, Beethoven and Chopin. He conducted the first Wagner concerts in London 1873–74, and has published ‹Musical Ornamentation›; ‹Richard Wagner: His Tendencies and Theories›; ‹The Music of the Future›; ‹On Conducting,› and also the sixth volume of the Oxford History of Music, ‹The Romantic Period› (London 1905).

D'ANNUNZIO, dä-noon'zyō, **Gabriel,** Italian novelist, dramatist and poet: b. 1864. See ANNUNZIO, GABRIEL D'.

DANTAN, dăn-tăn, **Antoine Laurent,** DANTAN THE ELDER, French sculptor: b. Saint Cloud, 9 Dec. 1798; d. there, 31 May 1878. He was a pupil of Bosio, taking the second grand prize of Rome for sculpture in 1823 and the first prize in 1828, the latter for a ‹Death of Hercules.› Yielding himself, at first, entirely to the influence of the antique in his art, he afterward found a more original style. He obtained the decoration of the Legion of Honor in 1843, and secured a medal of the third class at the Exposition in 1855. Among his works are ‹Young Bather and Dog› (1835), which took a medal of the first class, 1833; ‹Drunkenness of Silenus› (1836); a bronze ‹Young Girl and Tambourine› (1838); Statue of Louis Joseph de Bourbon›; ‹Statue of the Maréchal de Villars›; ‹Bust of the Dauphin of France.› A monumental ‹Juvenal des Ursins› was ordered for the Hotel de Ville in Paris 1838; and ‹The Angel Raphael› for the Madeleine 1839. ‹Duquesne› was made for Dieppe in 1844, and a ‹Saint Christopher› for the church of La Villette in 1846. He was the author of many statues decorating the monuments of Paris, the churches of Saint Gervais, Sainte Clotilde, Saint Laurent, the Tower of Saint Jacques, the belfry of Saint Germain l'Auxerrois and the new Louvre, besides busts for the museum at Versailles, the senate and the Comédie Française.

DANTAN, Jean Pierre (called DANTAN THE YOUNGER), French sculptor: b. Paris 26 Dec. 1800; d. Baden, 6 Sept. 1869. He was a brother of A. L. Dantan (q.v.). He achieved great reputation for his diverting caricatures of prominent men, such as Paganini, Rossini, Victor Hugo, Frederic Soulie, Balzac, Alexander Dumas, Frederic Le Maitre and of himself which were exhibited at the Dantan Museum in Paris, but his popularity as a caricaturist injured to some extent his fame as a serious artist. Among his works are statues of Boieldieu, at Rouen; Philibert Delorme, at the Louvre; and busts of Adelàide Kemble, Rose Cheri, Canrobert, Jean Bart, Pleyel, Rossini, Thalberg, Duke of Wellington and Lord Brougham.

DANTAN, Joseph Edouard, French painter: b. Paris, 26 Aug. 1848; d. Villerville 1897. He was a son of J. P. Dantan (q.v.). He was a pupil of Pils, but soon abandoned historical and religious for genre painting. Among his works are ‹The Holy Trinity›; ‹An Episode of the Destruction of Pompeii› (1869); ‹A Monk Carving a Christ in Wood›; ‹Hercules at the feet of Omphale› (1874); ‹The Nymph Salmacis and the Young Hermaphrodite› (1876); ‹Vocation of the Apostles Peter and Andrew› (1877); ‹The Corner of a Studio' (1880), in the Luxembourg; 'Breakfast of the Model' (1881); 'Interior at Villerville' (1883); 'The Studios' (1884); 'The Widower' (1885); 'Modeling from Nature' (1887).

DANTE (orig. DURANTE) **ALIGHIERI,** dān'tă a"lẽ-gya'rē, Italian poet: b. Florence, May 1265; d. Ravenna, Italy, 14 Sept, 1321. He was of a family belonging to the lower nobility and of mixed descent, the Aldighieri, or Alighieri, being originally Teutonic. He lost his father in early life, but his mother watched carefully over his education, which was confided to the eminent philosopher and statesman, Brunetto Latini. He is said to have studied at Bologna, Padua, Naples, and even Paris and Oxford, but we have no means of confirming the statement in any measure. What is tolerably certain is that he had mastered the learning of that age. He was a musician and painter, a theologian and linguist of no mean order. Many of his biographers state that it was in 1274, when nine years of age, that he saw for the first time, and ever afterward devotedly loved, Beatrice Portinari. Others affirm that that event took place shortly before her death, in 1290, three years after she had married a noble Florentine, Simone Bardi. His love for her awakened in him a new life; all the powers of his soul were to be henceforth devoted to immortalize her, and we can watch the struggles of his spirit in that record he has left us of his early years, the 'Vita Nuova.' About the period when Dante reached the age of manhood the Guelfs (the Papal or Church party) were predominant in Florence, whence they had, aided by the Pope and Charles, king of Naples, driven the Ghibellines (the imperial or state party). At Arezzo, on the other hand, the Ghibellines had succeeded in exiling the Guelfs, who implored the assistance of their Florentine friends. A war was declared between the two cities, which was terminated in June 1289 by the battle of Campoldino, in which the Ghibellines were defeated. Dante was there fighting bravely and contributed not a little to the victory of the Guelfs. In 1291 he married Gemma dei Donati, a daughter of one of the most powerful families of the state, and which belonged to the Guelf faction. By this lady he had seven children, the youngest, Beatrice, being born about 1301. In 1293 a revolution broke out in the city, headed by Giano della Bella, whereby the priors of the trades took the power into their own hands and made nobility a disqualification for holding office. The following year, however, Giano della Bella was deprived of power and the nobles disagreeing among themselves and splitting into two factions, the Bianchi and the Neri (the White and the Black), the streets of Florence were continually the scenes of sanguinary fights. In order to check the excesses of the greater nobles, a number of the lesser nobility, Dante among them, threw in their lot with the citizens' party. In order to render himself eligible for office Dante had his name inscribed in the books of the physicians and apothecaries, and in June 1300 was nominated a prior of the trades, one of the highest offices in the state. Although leagued by marriage to the Guelf side, Dante was no rampant partisan, and on one occasion, when roused by some fresh act of atrocity he proposed and carried a law to the effect that the heads of the Bianchi and Neri parties should be temporarily banished. It appears that the Bianchi and Neri were originally Guelfs, but the latter were the extreme Papal party, and the former leaned toward a reconciliation with the Ghibellines. Dante's sympathies were with the Bianchi and on the too hasty return of one of the exiles, Guido Cavalcanti, a friend of the poet's, and one of the Bianchi, Dante was charged with undue partiality in permitting him to remain in the city. The Neri wrote to the Pope that the Bianchi were making common cause with the Ghibellines and Boniface VIII sent Charles of Naples to occupy the town and keep down the turbulent spirit of the Florentines. The Neri were allowed, however, to commit the greatest excesses unchecked by Charles: many of their rivals were slain in the open street and their houses burned to the ground; among others that of Dante, who had been sent to Rome by his party to try to influence the Pope in their behalf. Taking advantage of his absence, his enemies obtained a decree of banishment against him, together with the heads of his party and he was further condemned to pay a fine of 8,000 florins or have his property confiscated (January 1302). Two months later a second sentence was launched against him and several of his friends: they were condemned to be burned alive for malversation, peculation and usury. The fine he refused to pay, as it would imply a confession of guilt.

From this time forth the life of the poet becomes semi-mythical. We find some traces of him first at Arezzo, then at Siena, then at Verona. He himself says, "Through almost all parts where this language (the Italian) is spoken, a wanderer, well nigh a beggar, I have traveled, showing against my will the wounds of fortune." His sympathies now lay entirely with the Ghibelline party. The expedition of the emperor, Henry VII, into Italy (1310) roused the hopes of Dante to the highest pitch. He wrote the emperor that famous letter advising him first of all to crush the hydra, Florence, as being the cause of all the misfortunes of Italy. Henry, however, spent his time in foolish inactivity till his death in 1313. Shortly after this event Dante is said to have visited Paris; but according to Balbo he spent the year 1313–14 in Pisa and Lucca and then took refuge with Can Grande della Scala at Verona, where he remained till 1318. In 1316 Florence sent forth a decree permitting the exiles to return on conditions of fine and penance, which Dante indignantly refused. In 1320 we find him at Ravenna staying with his friend Guido Novello da Polenta. In the following year, on his return from an embassy to Venice, his wanderings and sufferings were ended by death. He was buried in the church of the Minorites, under a monument built by his friend Guido Novello, on which was an epitaph written by Dante himself. Such, imperfectly sketched, was the career of the great poet; by it he gained a sense of the nothingness of earthly honors and prosperity possible only to the rich, and a knowledge of man possible only to the poor. In his youth living amid the excitement of the tented field and penning sonnets to his adored Beatrice; in his old age compelled "to climb the stranger's toilsome stairs and eat the bitter bread of others." Out of his misfortunes the world found her rich account; the apocalypse of the Middle Ages, the ‘Divina Commedia,’ was begun and finished in his year of exile. Of this grand poem we can give only a very brief analysis. It is divided into three parts: Hell, Purgatory and Heaven. Each part is subdivided into 33 cantos, in allusion to the years of our Saviour's life, the extra canto in the first part being introductory. Dante dreams that he had “reached the half-way point in his path of life, at the entrance of an obscure forest.” He would advance, but three horrible beasts bar the way; then the shade of Virgil appears and offers itself as his guide. Dante accepts and then takes place that wondrous journey in the “world of souls.” Virgil tells him he can only accompany him through hell and Purgatory; but that Beatrice shall conduct him through those happy spheres, the portals of which a pagan may not enter. Now begin the peregrinations of the Florentine through the regions of the damned, over the entrance of which is written the awful words — “All hope abandon ye who enter here.” This is the most impressive and best-known part of the poem; the singular diversity of the chastisements; the rapidity with which Dante passes in review the great criminals of history; the intensity with which he paints, at a single dash, so to speak, their distorted features; the grace of certain episodes (the adventure of Francesca da Rimini, the death of Ugolino and that of Manfred), attest the vigor of imagination never surpassed, if ever equaled. From Hell (which the poet places in the centre of the earth) he ascends to Purgatory, a solitary mountain rising from the ocean on the side of the globe opposite to us. This mountain is divided into terraces and its top is the terrestrial paradise, the first abode of man. In Purgatory there are still scenes of pain and suffering; but these punishments are only temporary. The poet hesitates when he comes to a path filled with a sheet of flame; but Virgil speaks: “Between Beatrice and thee there is but that wall.” Dante at once plunges into the heart of the flames. The two poets have now reached the earthly paradise and behold Beatrice surrounded by a scene of surpassing magnificence; noble forests, whose trees are gently moved by celestial zephyrs; the melodious songs of birds to which the murmuring of the sacred woods and streams give harmonious reply; meadows of the freshest green and groves of deepest shade. From this enchanting region Dante ascends faster than tongue or pen can tell, into the celestial paradise. This realm consists of 10 heavens or circles. Dante roams at first over the seven planets, the Moon, Mercury, Venus, the Sun, Mars, Jupiter and Saturn; then he enters the eighth sphere, and at last into the empyrean. Each of these globes has its inhabitants, who are souls or spirits. Arrived at the eighth sphere, he looks down upon our globe; but the earth appears so abject that he smiles with pity upon it. Beatrice calls his attention to a nobler scene. “See the glorious company which surrounds the triumphant Redeemer.” The eyes of the poet cannot sustain the splendor of the view. In the ninth sphere Dante feels himself in the presence of the Divine essence, hid from his sight by three hierarchies of angels. He sees the souls of the blessed on thrones in a vast amphitheatre, whose steps and circles widen into infinity. Beatrice takes her place upon her throne of glory; from that sublime height she smiles benignantly down upon the poet; then turns toward him who is the source of life and light. Thus ends the Divine trilogy, the noblest effort of the Middle Ages.

The name “Commedia” is derived from Dante's idea concerning the forms of eloquence, which were in his opinion tragic, comic and elegiac, as he relates in his work ‘De vulgari Eloquio,’ which was first written in Latin. What he called tragedy was a piece commencing with happy and peaceful scenes, and ending with events of a painful and terrible character, and what he called comedy was a piece which, beginning unpleasantly, terminated happily. The qualifying word divina was, however, added by others. We may mention the opinion maintained in 1753, by Bottari, that Dante made use of the ‘Vision of Alberico’ a monk who lived in the 12th cetury, in a monastery on Monte Cassino, in Naples. There have been many such visions from the earliest ages of Christianity; as, for instance, the ‘Vision of an English Monk,’ which Matthew Paris mentions in his ‘History of England’ (in the year 1196), and which resembled Dante's poem much more than the ‘Vision of Alberico’ published by Cancellieri in 1814 at Rome, with observations (‘Osservazioni intorno alla Questione sopra la Originalità della Divina Commedia di Dante’). It is possible that Dante here and there may have borrowed a thought or image from those visions; but this is no fault: the recollections of great men are sparks which serve to kindle mighty flames.

There is no poet who bears so distinctly the impress of his age, and yet rises so high above it, as Dante. The Italians justly regard him as the creator of their poetical language, and the father of their poetry, which, regulated and controlled by his genius, at once assumed a purer and far nobler form than it had previously worn. The terzina first reached its perfection in the time of Dante, on which account he has been erroneously regarded as the inventor of it.

Florence soon recognized that she had lost her noblest son. In 1350 a sum of 10 golden florins was ordered to be paid by the hands of Giovanni Boccaccio to Dante's daughter, Beatrice, a nun in the convent of Santa Chiara at Ravenna. In 1373 an annual sum was granted for public lectures, to explain the ‘Divine Comedy’ in the churches, and Boccaccio was one of the first lecturers. A monument was voted for if Ravenna would give up the now sacred remains, which that city refused, and has repeatedly refused to do. In May 1865 all Italy assembled at Florence to render homage to the seer who prophesied so confidently her unity; and the following year a colossal statue of the poet was erected on the Piazza della Croce.

The best editions of the ‘Divina Commedia’ are those of Lombardi (1791), frequently reprinted with valuable improvements, of Viviani (1823), of Bianchi (5th ed., Florence 1857), of Karl Witte (Berlin 1862), etc. In 1821 Luigi Fantoni published an edition of the ‘Divina Commedia,’ stated to have been printed from a manuscript in the handwriting of Boccaccio. In 1869 the ‘Vernon Dante’ was published in London by Lord Vernon in three large volumes folio. It contains the text of the ‘Inferno,’ and, in Italian, an explanation of everything in the text regarding which any reader might have the least difficulty, together with an immense mass of information — biographical, topographical, historical, etc., relating to the life and times of Dante, and a large number of maps, plans and illustrative plates. Dante's complete works appeared at Venice in 1757–58, published by Zatta (in 5 vols. 4to). His lyric poems, sonnets and canzonets, of which some are beautiful, others dull and heavy, were written at different periods of his life. We have yet to mention his 'Banquet' (Il Convito) — a prose work worthy, says Bouterwek, to stand by the side of the best works of antiquity. It contains the substance of all his knowledge and experience, and thus illustrates his poetry and his life. The most popular English translation of the 'Divina Commedia' is that by Cary in blank verse (1814). Longfellow executed a faithful poetic version (1867); and that by Dean Plumptre in the original metre deserves mention. Other English translations are Boyd's (1785), Wright's (1833), Pollock's (1854), Parsons-Norton's (1891–92). The German translations are numerous, and are highly praised for faithfulness and force. The translation by Kannegieser is in the measure and rhyme of the original; that of Philalethes (King John of Saxony) has a deservedly wide reputation. The French have four or five translations, including one by Lamennais, but that graceful and feminine tongue is incapable of doing anything like justice to the manly thoughts of Dante.

In one respect Dante stands unrivaled by any man, as he, we might almost say, created the language, which he elevated at once to its highest perfection. Before him very little was written in Italian, Latin being the literary language; but no one attempted to use the *lingua volgare* for the purposes of dignified composition. The poet, indeed, thought it necessary to excuse himself for having written in Italian after having attempted to compose his poem in Latin. Thus he is to be regarded as the founder of Italian literature. One of the strangest productions of Dante is his 'De Monarchia.' He labors in this work to prove that the emperor ought to have universal authority, and draws his arguments from the sacred Scriptures and from profane writers, which in this book appear very often with equal authority. The dialectics of the schoolmen are here exhibited in a most characteristic way. The 'De Monarchia' is valuable as a source of information respecting the great struggle of the Guelfs and Ghibellines and its influence upon the Christian world at that time. This struggle was a part of the great convulsion attending the separation of the civil power from the ecclesiastical, with which in the earliest ages it is always united. On the whole, Dante's works are important chiefly in three respects — as the productions of one of the greatest men that ever lived, as one of the keys to the history of his time, and as exhibiting the state of learning, theology and politics in that age. To understand Dante it is necessary to be acquainted with the history and spirit of his time, particularly with the struggle of the Guelfs and Ghibellines, the state of the north of Italy, and the excitement caused by the beginning of the study of the ancients; also to have studied the Catholic theology and the history of the court of Rome, and to keep always in mind that Dante was an exile, deprived of home and happiness. The personal appearance and character of the man are thus described by Boccaccio: "Our poet was of middle height; his face was long, his nose aquiline, his jaw large, and his under lip protruding somewhat beyond the upper. His eyes rather large than small; his hair and beard thick, crisp, and black, and his countenance sad and pensive. His gait was grave and gentlemanlike, and his bearing, in public or private, wonderfully composed and polished. In meat and drink he was most temperate. Seldom did he speak unless spoken to, though he was most eloquent. In his youth he delighted in music and singing, and was intimate with all the musicians and singers of the day. He was of marvelous capacity and the most tenacious memory; inclined to solitude and fond of study when he had time for it." See VITA NUOVA; DIVINA COMMEDIA.

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DANTON, dän-tôn, **Georges Jacques**, French revolutionist: b. Arcis-sur-Aube, 26 Oct. 1759; d. Paris, 5 April 1794. He played a very important part during the first years of the French Revolution, of which he was an active and zealous promoter. His external appearance was striking, his stature was colossal, his frame athletic, his features harsh, large and disagreeable; his voice shook the dome of the chamber of the assembly, his eloquence was vehement and his imagination was as gigantic as his person. These qualities contributed to extend his influence and he became one of the founders of the club of the Cordeliers. After the capture of Louis XVI at Varennes he took the lead in the meeting of the Champ-de-Mars which demanded the dethronement of the king. He is said to have had a share in organizing and conducting the attack on the Tuileries (10 Aug. 1792); a few days afterward he was appointed Minister of Justice. He also became a member of the provisional executive council and usurped the appointment of officers in the army and departments. Money flowed from all sides into the hands of the minister, and was as profusely squandered on his tools and partisans. He endeavored by the terrors of proscription to annihilate all hope of resistance on the part of the Royalists. The invasion of Champagne by the Prussians 2 September spread consternation through the capital. The ministers, the most distinguished deputies and even Robespierre himself now relied upon Danton, and never was his splendid courage and audacity more strikingly manifested. He assumed the administration of the state and prepared measures of defense, called on all Frenchmen capable of bearing arms to march against the enemy, and prevented the removal of the assembly beyond the Loire. The close of his celebrated speech has been often quoted, «Le tocsin qu'on va sonner n'est point un signal d'alarme, c'est la charge sur les ennemis de la patrie. Pour les vaincre, il nous faut de l'audace, encore de l'audace, toujours de l'audace, et la France est sauvée!» From this time forward he was hated by Robespierre, who could never pardon the superiority which Danton had shown on that occasion. He voted for capital punishment being inflicted on all returning Royalists and undertook the defense of religious worship. The contest between the Girondists and the Mountain daily assumed a more serious aspect, and Danton, while he feared the consequences of these dissensions, allowed matters to drift. He wished to overthrow the despotism of Robespierre, and the crafty Robespierre endeavored to undermine him in order to get rid of a dangerous rival. St. Just denounced him to the Committee of Public Safety and Danton was arrested on the night of 31 March 1794, together with those who were called his accomplices. Being thrown into prison in the Luxembourg he maintained the appearance of serenity. When transferred into the Conciergerie his countenance became dark and he appeared mortified at having been the dupe of Robespierre. All his discourses were a strange mixture of sorrow and pride. At his trial, on the formal question as to his name and residence being put, he answered, with perfect composure, «I am Danton, sufficiently known in the Revolution; I shall soon pass to nothingness, but my name will live in the Pantheon of history.» So powerful and defiant were his speeches in reply to his accusers that St. Just got a resolution passed by the revolutionary tribunal that the mouths of men who had «insulted justice» should be shut, and on 5 April he mounted the fatal car with courage, his head elevated, his look commanding and full of pride. Before ascending the scaffold he was for a moment softened. «Oh my wife, my dear wife! shall I never see you again?» he exclaimed, but checked himself hastily and by calling out «Danton, no weakness!» ascended the scaffold. Consult Robinet, ‘Danton, Mémoire sur la vie privée’ (1865); Bougeart, ‘Danton’ (1861); Dubost, ‘Danton et la politique contemporaine’ (1880); Gronlund, ‘Ça ira! or Danton in the French Revolution’ (1882); Beesley, ‘Life of Danton’ (1889); Morse-Stephens, ‘Orators of the French Revolution’ (1892); Belloc, ‘Danton: a Study’ (1899).

DANTZIC, DANTSIC, or DANZIG, dănt'sĭн, Germany, city and port of Prussia, capital of the province of West Prussia, 253 miles northeast of Berlin; on an arm of the Vistula (now cut off by a dam from the river), about three miles above its mouth, and on the Mottlau, several arms of which traverse the town. It is one of the most important seaports under the Prussian monarchy, as well as one of its chief commercial entrepôts. It is nearly circular in form and ranks as a fortress of the first class. The fortifications on the north and west side gave place about 1896 to streets and public gardens, those on the east and south being retained and strengthened. Provision is also made for laying a considerable part of the surrounding country under water. It is entered by four gates, has nine suburbs, and is divided into five parts — the Old, New and Low town, the Speicher (granaries), an island, and Langgarten. The last is the more modern part of the town and is regular and well built. The principal edifice is the Dom, or cathedral, begun in 1343, but not finished till 1503. It is 360 feet long by 142 feet broad, and its vaulted roof, 98 feet above the pavement, is supported by 26 slender brick pillars. It possesses a fine brass font and a curious astronomical clock, which has long ceased to move, but its chief attraction is a painting of the ‘Last Judgment,’ attributed to John Van Eyck. The other buildings and institutions deserving of notice are the town-house, the church of Saint Catharine, the oldest in Dantzic, and the exchange, an imposing Gothic edifice, built in 1379. Many of the modern public buildings are models of architecture. It is the seat of the provincial government and contains the various offices connected therewith; and is also the seat of a United States consulate. It is governed by a municipal council of 63 members, effectively controlled by a smaller executive council. It has excellent water supply and sewerage systems; owns the gas and electric plants, and is well equipped with educational and charitable institutions. The industrial establishments include several shipyards, works for artillery and firearms, iron foundries, machine shops, steel works, breweries, distilleries, works producing the liqueur called Danziger Goldwasser, or Eau de Vie de Dantzic, flour-mills, saw-mills, paper-mills, rope, wire, oil, chemical, soap and glass works. Although losing as a shipping centre in favor of ports more favorably situated, it is developing rapidly in manufacturing industries. A considerable part of the trade is of products in transit. Among imports the chief are coal, iron, cured herrings, salt, tallow and lard, petroleum, rice, coffee and some breadstuffs. The chief exports are timber, beet-sugar, grain and seeds, oil-cake, flour, spirits and molasses. Dantzic has a great trade in grain, especially wheat, rye and barley, for the warehousing of which there are immense granaries on the island of Speicher. The wheat, which is chiefly Polish, is remarkable for both the quantity and the quality of the flour which it yields. There is considerable trade at Dantzic in amber, which is manufactured into various ornamental articles. The proper port of Dantzic is Neufahrwasser, at the mouth of the Vistula (now known as the dead Vistula), and connected with it by an artificial channel. Here a free port has recently been established. By dredging and otherwise, various obstructions to navigation have been removed and vessels of large size come up close to the town. The history of Dantzic reaches back to the times of historical obscurity. As early as 970 there was a town here. In 1271 it was taken by Mestwin, and in 1294 by the Poles. In the 14th century it fell into the hands of the Teutonic Knights, under whose sway the town increased and its commerce was extended. In 1358 the city joined the Hanseatic League; in 1454 it fell into the hands of the Poles, who granted it important privileges. After enduring many vicissitudes of fortune, on the second partition of Poland, in 1793, it came into possession of Prussia. It was besieged, bombarded and taken by the French in 1807 and retaken by the Prussians in 1814. Pop. 170,337.

DANUBE (ancient, DANUBIUS; German, DONAU; Hungarian, DUNA), the second river of Europe, originating in two small streams, the Brege and the Brigach, rising on the east slope of the Schwarzwald, a mountainous region of southwest Germany (the Black Forest), in the Grand-duchy of Baden, at an elevation of 2,850 feet above sea-level, and uniting at Donaueschingen. Its general course is from west to east, and it flows into the Black Sea by four different outlets, called respectively the Kilia, Stambool, Sulina and the Edrillis or Saint George's mouths. The Sulina mouth or channel is the deepest. The extent of the basin of the Danube is about 300,000 square miles, and its total length is about 1,875 miles. The Danube basin comprises portions of Austria-Hungary, Germany, Serbia, Bosnia, Rumania and Bulgaria. From its source it flows northeast to Ratisbon, in Bavaria, whence it takes a southeast course, by Vienna and Pressburg, to Waitzen, in Hungary. Here the course is changed to nearly due south of the point where it receives the waters of the Drave, near Esseg, in Slavonia; thence it flows southeast to Belgrade, on the north boundary of Serbia, and for some distance it forms the boundary between Serbia and Austria. The course continues in an easterly direction to Orsova (the Iron Gate), where it changes to southeast, then again nearly east, forming for a long distance the boundary line between Rumania and Bulgaria. At Silistria, in Bulgaria, it turns more to the north, through Rumania to Galatz, then southeast between Rumania and Bessarabia, in Russia, and finally into the Black Sea.

The great basin of the Danube has been divided into four minor basins. The first consists of a vast plateau 1,640 feet above sea-level, 150 miles in length and 125 miles broad, surrounded by mountains, and comprising a portion of the principality of Hohenzollern, part of the kingdom of Würtemberg and the greater part of the kingdom of Bavaria. This tract is by far the most fertile and most populous through which the Danube passes on its course. The principal branches within this space are the Iser and Lech. A canal connecting the Altmühl with the Regnart, an affluent of the Main, gives access to the Rhine.

The second basin belongs to the empire of Austria, having Vienna nearly in its centre, and comprising the archduchy of Austria, Hungary as far east as Waitzen, and Styria. It is very irregular and is bounded by very high mountains. The soil is rich in mineral products and the climate one of the best in Europe. The principal branches in this basin are the March or Morava and the Enns — the former from the left and the latter from the right. The Danube here passes through a succession of the most picturesque scenery.

The third basin of the Danube comprises Hungary east of Waitzen and the crownland of Transylvania, and consists of an immense plain, almost without undulations of any kind, and only 394 feet above the sea-level. It is intersected by large rivers with marshy banks, and interspersed with stagnant pools, saline and sandy wastes. It comprises about one-half of the entire basin of the Danube. The marshes cover a space 3,053 square miles. The principal branches in this basin are the Save, the Drave and the Morava. From Budapest to Belgrade the river passes through an immense plain covered with sand and alluvium, through which it is constantly forming new channels and filling up the former ones. Below Moldava it passes for 60 miles through a succession of rapids and shallows interspersed with rocks and sandbanks, where it has cut a passage for itself through the cross chain of hills which connect the Carpathian Mountains with the Alps; and between Drenkova in Hungary and Scala Kladova in Serbia, the navigation is partially interrupted by three great rapids, the principal or last and lowest of which is the famous Iron Gate, where the stream rushes through a narrow channel between stupendous rocks, ending with a series of whirlpools, eddies and smaller falls. By the removal of various obstructions vessels drawing nine feet have long been able to pass at certain seasons; and by works carried out in 1890–96, and extending over some 50 miles, a permanent waterway has been secured.

The fourth basin comprises Rumania, a portion of Bessarabia and Bulgaria. This tract is flat, inundated and marshy along the banks of the river; dry and mountainous on the borders of the basin. The principal branches in this basin are the Aluta, Sereth and Pruth. In the lower part of its course the Danube increases in width from 1,400 to 2,100 yards; and in one part it forms an expanse of water like a sea and is studded with islands. Excepting between Drenkova and Kladova, the Danube may be said to be navigable for steamers from Ulm to the sea, although in some places navigation is rendered difficult by shallows and sandbanks, intersected by narrow and intricate channels. The outlets of the Danube are separated from each other by several low islands covered with reeds and trees. The greater part of the ships bound up the river enter it by the Sulina mouth. The Danube has 60 navigable tributaries, and its volume of water is nearly equal to that of all the rivers that empty themselves into the Black Sea taken together. Its rapidity is in many places above Orsova so great as to render navigation difficult, but below that point its current is less rapid. A number of steamers now ply on the river between its principal towns. The principal towns on the banks of the Danube are Ulm, in Würtemberg; Regensburg (Ratisbon) and Passau, in Bavaria; Linz and Vienna, in Austria; Pressburg, Budapest and Peterwardein, in Hungary; Belgrade, in Serbia; Widin, Nicopolis, Rustchuck and Silistria, in Bulgaria; Brahilow and Galatz, in Rumania.

Under the terms of the Peace of Paris in 1856, the Danube was declared free to the ships of all nations; and at the Berlin Congress of 1878 it was agreed that no ships of war should navigate below the Iron Gate.

DANUBE NAVIGATION COMMISSION, an international commission, constituted in 1856, when at the Peace of Paris the navigation of the river was declared free to all nations. It was composed of delegates of all the great powers, to whom a representative of Rumania was added in 1878. It was appointed on the express condition that it should dissolve in 1858, but such was its usefulness that it was informally continued till 1866, when the Conference of Paris formally prolonged its powers for five years. In 1871 the Conference of London continued the commission for 12 years, and in 1883 a second London conference extended its existence for 21 years. It exercises almost sovereign power on the mouths of the Danube, where it has conducted great engineering works; it has its own flag, uniform and revenue, and has raised loans, made laws and maintained its own small army of police. Its jurisdiction, originally limited to the river between Isaktcha and the sea, was extended at the Congress of Berlin (1878) as far as Galatz, and afterward to the Iron Gate; but in the last-named portion of the stream its authority is exercised only by delegation to the Riverain Commission of the states on the bank, or on appeal from its decisions.

DANVERS, Mass., town in Essex County, on the Boston and Maine Railroad, five miles northwest of Salem. It was a portion of Salem till 1756, and the Salem village parish where the witchcraft excitement broke out and 10 of the inhabitants were tried and hanged, is included in the present Danvers. It is the seat of Peabody Institute, founded by George Peabody, a resident of the place, who in 1852 donated $200,000 for the promotion of knowledge and morality among the inhabitants. It is also the seat of the Danvers State Hospital, Essex County Agricultural College, the Danvers Historical Society and Saint John's Roman Catholic Preparatory College. Danvers has extensive manufactures of shoes, bricks and carpets, and has foundries, rolling mills, tanneries, municipal water works and electric lighting plants, churches, high school, weekly newspapers, public library, a national bank and good public and private schools. Samuel Holton, Israel Putnam and Grenville Mellen Dodge were born at Danvers, which also contains the home of Whittier and Mount Burnett, frequented by Hawthorne. Pop. 9,407.

DANVILLE, Ill., city, county-seat of Vermilion County, on the Vermilion River, and the Wabash, Chicago and Eastern Illinois and the Cleveland, Cincinnati, Chicago and Saint Louis railroads; 125 miles south of Chicago. It has a National Soldiers' Home for disabled veterans, with over 2,500 inmates. Its chief industry is coal mining, which is carried on extensively on the bluffs of the river. Other important industries are flour and lumber mills, marble, zinc, smelting, boiler and iron works, glass and hardware factories and railroad and machine shops. There are many churches, 13 public schools, a high school, a number of new public buildings, including post office and government building, courthouse, city hall, public library, chamber of commerce, Y. M. C. A., Elks' club house and six fire departments, four national banks, two State banks, two daily papers. Bank clearings 1915, $26,602,812.47. The city is governed by a mayor and 14 aldermen. Pop. 35,000.

DANVILLE, Ind., town and county-seat of Hendricks County; situated on the Cleveland, Cincinnati, Chicago and Saint Louis Railroad, about 20 miles west of Indianapolis. The manufacture of flour and lumbering are the principal industries. It is the site of the Central Normal College, a private institution, and has a Carnegie library. Pop. 1,640.

DANVILLE, Ky., city, county-seat of Boyle County, on Dick's River and the Cincinnati Southern Railroad, 42 miles south of Frankfort. It is a stock-raising centre and the noted seat of several educational institutions, among them the Danville Theological Seminary, the Southern Collegiate Institute, Center College, the Caldwell Female Institute and also the State Asylum and School for Deaf-mutes. It has churches, public schools, municipal waterworks, three national banks and weekly newspapers. Danville was settled in 1781 and became a strong political centre, the seat of nine historical conventions. Here the separation from Virginia was discussed and the first State constitution framed, which selected Frankfort as the capital. Danville received a charter of incorporation in 1789. James G. Birney and Theodore O'Hara were born in Danville. Pop. 5,420.

DANVILLE, Pa., borough and county-seat of Montour County; on the Susquehanna River, and on the Pennsylvania, the Lackawanna and the Philadelphia and Reading railroads; 154 miles northwest of Philadelphia. Danville is in a district abounding with iron ore, limestone and anthracite coal, and contains the first establishment erected in the United States for the manufacture of railroad iron. It still ranks among the most extensive iron manufacturing places in the country. There are blast furnaces, iron foundries, rolling-mills, stove works, silk and knitting mills, municipal waterworks and electric lighting plant, churches, two national banks, the Danville Institute, a State asylum for the insane, hospital, public library and opera house. First settled in 1776 and laid out in 1792 as Dan's Town, named after the son of the first settler, Danville developed after the discovery of iron on Montour Ridge and the opening of the Pennsylvania Canal in 1832. It was incorporated in 1849. Pop. 7,517.

DANVILLE, Va., city and county-seat of Pittsylvania County, on the Dan River, 140 miles southeast of Richmond, on the Danville and Western and the Southern railroads. One of the oldest cities in the South; incorporated as a town in 1792. For a short time during the last days of the Southern Confederacy it was the seat of government. It is located in the famous and picturesque Piedmont section of Virginia, on a gradual slope extending from the river to an altitude of 600 feet above the sea. The river furnishes power for the cotton-mills, flour-mills, foundry, ice factory and electric light plant; and further development of its water power has been made about three miles up the river, at an estimated cost of $2,000,000. Danville is the largest loose tobacco market in the world, her average annual sales being 50,000,000 pounds. The surrounding country is well adapted to grain, fruits and tobacco. The improvements in public utilities within the past few years include larger water mains in the down-town district (16-inch) and additional fire engines at a cost of $23,000; Main street repaved with Belgian block and Mack brick, $100,000; Craghead street, same material, $24,500, and several other less important streets paved with cobble. Further extension of the sewerage system from time to time as the growth of the city requires; new electric-light plant owned by city, with new $5,000 incandescent machine, furnishing lights for streets, business and dwelling houses; electric railway system rebuilt at a cost of about $320,000, first-class equipment, double track on Main street, about eight miles of track, new power-house, with double set of dynamos and engines. The Southern Bell Telephone and Telegraph Company has expended about $30,000 in improvements, and the growth of their business has been such as to require additional accommodations. Danville is the seat of Roanoke Female College (Baptist), established 1859, Randolph Macon Institute for Young Ladies (Methodist), founded in 1883, and Danville Military Institute, established in 1890. The climate of the city is mild and pleasing, the streets well shaded and paved, and as a residential city it is excelled by few locations in the South. There are many new public buildings, churches and schools; a general hospital recently enlarged and fitted with the latest improvements, seven banks — one national, five State and one private and two daily newspapers. Under the new constitution of the State the municipal government is administered by a mayor, elected quadrennially, and a city council, composed of two branches having different numbers, which controls appointments to most of the administrative offices. The waterworks, electric light and gas plants are owned and operated by the municipality. Pop. 19,020.

DANZIG. See DANTZIC.

DAPHNE, daughter of river-god Peneus. See LAUREL IN ART AND SYMBOLISM.

DAPHNE, a famous grove near Antioch, planted by Seleucus Nicator, who erected a temple there and dedicated it to Apollo and Diana. It was a place of pagan pilgrimage noted for its license, until the spread of Christianity caused its abandonment. Julian sought to revive its splendors but the temple was burned and the site was soon after abandoned. Its probable site is the modern Bêt-el-Mâ, where the vegetation is luxurious, but ancient remains are few. A graphic description of this grove is given in 'Ben Hur.' For Daphne in Egypt see TAHPANHES.

DAPHNE, a genus of plants belonging to the *Thymelæaceæ* or mezereon family. The genus has about 80 species, natives of Europe and Asia. The single American species is the spurge or lady laurel found in northern New England and New York as a fugitive from cultivation. The berries are poisonous and the flowers of many are very fragrant. These plants are common in temperate climates in Europe and Asia, and are valuable commercially. From the bast of some species fibres are obtained, and most of the paper used in central Asia is made from some species of the daphne. The inner bark of *D. lagetta,* when cut into thin pieces after maceration, assumes a beautiful net-like appearance, whence it has received the name of lace-bark. The bark of the spurge-laurel is used in decoction as a diaphoretic in cutaneous and syphilitic affections. Paper and ropes are made from the bark of a species common in Madagascar.

DAPHNEPHORIA, one of the most ancient and important of the Greek festivals observed in honor of Apollo. See GREEK FESTIVALS.

DAPHNIA, a minute entomostracan crustacean of somewhat globular shape, which swarms in millions in ponds and ditches, and is important as a food for tadpoles, fish-fry and other small aquatic creatures. It is useful in an aquarium, but care must be taken that it does not multiply unduly.

DAPHNIN, a glucoside having the formula $C_{15}H_{16}O_9 + 2H_2O$, and occurring in the bark and blossoms of certain species of plants belonging to the genus *Daphne*. It is slightly soluble in cold water, from which it crystallizes in rectangular prisms containing two molecules of water. It is insoluble in ether, but readily dissolves in boiling alcohol. It reduces Fehling's solution slowly, and by the action of emulsin or of dilute acids it is converted into glucose and a substance called daphnetin, or di-oxycoumarin.

DAPHNIS, in fabulous history, the son of Hermes (Mercury) by a nymph, educated among the nymphs, and celebrated in the Sicilian traditions as the author of bucolic poetry, and also as a performer on the shepherd's pipe. He pastured his flocks upon Mount Ætna. The nymph Echenais, who loved the youth, threatened him with blindness if he should love another; but being intoxicated with wine by the daughter of a Sicilian prince, he forgot the warning, and thus brought upon himself the threatened punishment. Some say that he died of grief; others that the nymph transformed him into a stone. All the nymphs bewailed his death, and Hermes raised him to the heavens. On the spot where he died flowed a fountain, at which the Sicilians afterward performed yearly sacrifices. Consult Prescott, 'A Study of the Daphnis Myth' (in 'Harvard Studies in Classical Philology,' Vol. X, Boston 1899).

DAPHNIS AND CHLOË. This Greek prose pastoral romance, attributed to one Longus, about whom nothing is known, may have been written in the 2d or early in the 3d century A.D. Despite many marks of decadence, it is by far the most delightful of the Greek romances. Daphnis, a boy, and Chloë, a girl, infants exposed by their respective parents, are found and adopted by shepherds; and their fortunes are followed through the years of their love for each other as it grows with the ripening seasons,— to the happy end, when they are reclaimed by their parents, and married. The charm of the story lies in the children's naïve courtship and in the rich and exquisite scenery of their rural life, both the action and the setting being such as a sophisticated urban imagination frames for idealized dwellers in the Golden Age. The book appeals to every sense in a succession of lovely idyls.

It pleased the Renaissance, and has pleased the centuries since. The *editio princeps* was printed in 1598 (Florence); but in 1559 Jacques Amyot had already translated 'Daphnis and Chloë' into a French classic (often reprinted), from which in 1587 Angel Day made a wretched English paraphrase (reprinted London 1890 with introduction by Joseph Jacobs). Both versions gave Robert Greene material for his 'Pandosto' (1588), which in turn became the chief source of Shakespeare's 'The Winter's Tale' (1611); Shakespeare seems to have taken several details directly from Day. How much Allan Ramsay's 'The Gentle Shepherd' (1725) owes to 'Daphnis and Chloë' is not certain; its theme is much the same, as is that of Bernardin de Saint-Pierre's

'Paul et Virginie' (1789). An enlarged recension of Amyot's translation was published in 1810 by Paul Louis Courier, who in 1807 had found in a Florentine manuscript — and in 1809 had transcribed and then blotted — a portion missing from all other manuscripts. Of Pierre-Paul Prud'hon's admirable illustrations three appeared in the French version published by Didot and one other in Annibal Caro's Italian version, published by Renouard, both Paris 1800. The most useful and accessible English translation is that by George Thornley (first published in 1657), revised and augmented by J. M. Edmonds, 'Loeb Classical Library' (London and New York 1916).

Samuel Lee Wolff.

DAPITAN, dä-pē'tän, Philippines, a province in the northwestern part of the island of Mindanao. Numerous rivers are navigable for the native boats, and these are the chief means of communication in the province. Hemp, cotton, sugar, etc., are cultivated for domestic consumption; the forests, particularly the ebony, are valuable. There is some export trade in gums, wax, honey, cacao, etc. Pop. 20,270.

DAR-EL-BEIDA, där'el-bā'da, or **CASABLANCA**, Morocco, the largest seaport in the country, situated on the west coast. About one-fourth of the entire trade of the country passes through it. It is surrounded by walls. Wool and leather form the chief items of export. The Portuguese founded it in 1468. It was the scene of the revolt of 1907 against French control of Moroccan ports. Pop. 25,000, including 5,000 Christians.

DAR-ES-SALAAM, där'es-sa-läm', East Africa, a growing city, formerly the capital of German East Africa, situated on the coast a few miles south of Zanzibar. The harbor is good and the city has a number of churches and substantial public buildings. It has telegraphic connection with Zanzibar, Kilwa and Tanga. Copal, rubber and ivory are exported. Pop. about 24,000, including 500 Europeans and about an equal number of Arabs.

DARBHANGAH, dŭr-bŭn'gä, India, (1) a district in the Patna division of Bengal. In the rainy season the district becomes inundated by the overflow of the rivers Kamlá and Little Bághmati. Area 3,348 square miles; pop. under 3,000,000. (2) A town of the same name is the capital of the district. It is situated on the Little Bághmati, and is the residence of the maharaja of Darbhangah. The chief exports are oil-seeds and timber. Pop. 62,628.

D'ARBLAY, där'blā' (Madame), **Frances Burney**, English novelist, daughter of Charles Burney: b. King's Lynn, Norfolk, 13 June 1752; d. Bath, England, 6 Jan. 1840. When Frances was eight years old the Burneys removed to London, where at the musical assemblies given by her father she saw much of fashionable life. This she depicted with much humor in her first novel, 'Evelina.' After she had published 'Evelina, or a Young Lady's Entrance into the World' (1778), she became the favorite of the literary men of the day, especially Dr. Johnson. Her second novel, 'Cecilia' (1782), was no less admired. In 1786 she was made second keeper of the robes to Queen Charlotte. She disliked the position and resigned in 1791. While visiting her sister at Mickleham she made the acquaintance of her future husband, General D'Arblay, a French army officer, whom she married in 1793. Her other books are 'Camilla' (1795) and 'The Wanderer, or Female Difficulties' (1814). Her play, 'Edwy and Elvina,' was performed in 1795 and had little success, though having Mrs. Siddons and Kemble in the leading rôles. Her 'Diary and Letters,' edited by her niece (1842–46), surpass in modern estimation the rest of her writings. The record begins with 'Evelina.' The success of her first effort, the dinings, winings and compliments that followed, are recorded with a naïve garrulousness perfectly consistent with simplicity and sincerity. She also wrote memoirs of her father (1832). 'Evelina' and 'Cecilia' were published with introductions by Annie R. Ellis (London 1881–82). A new edition of the 'Letters and Diaries' in six volumes appeared in London in 1904–05. The 'Early Diary, 1768–1778' (2 vols., New York 1907) was edited by A. R. Ellis. Consult Dobson, 'Fanny Burney, Madame D'Arblay' (New York 1903); Hill, C., 'Fanny Burney at the Court of Queen Charlotte' (ib. 1912); and Macaulay, T. B., 'Essays.'

DARBOY, där-bwä, **Georges**, archbishop of Paris: b. Fayl-Billot, department of Haut Marne, 16 Jan. 1813; d. Paris, 24 May 1871. He was admitted to the priesthood 1836, and began regular parish work; but in 1839 became professor, first of philosophy, then of dogmatic theology in the ecclesiastical seminary of Langres. Removing to Paris in 1846 he was for a while attached to the College of Henry IV and was also editor of the journal *Moniteur Catholique;* in 1854 he was appointed vicar-general of the archbishop of Paris and inspector of religious instruction in the schools of the diocese, that is, superintendent of the Christian doctrine work in the diocese. In 1859 he was consecrated bishop of Nancy, and in 1863 was appointed successor to Archbishop Sibour of Paris, who had been slain by an assassin. He was a strenuous upholder of episcopal independence and became involved with Rome through his efforts to suppress the jurisdiction of the Jesuits and other religious orders in his diocese. Pius IX refused him the cardinal's hat and rebuked him for his liberalism. In the Vatican Council he was one of the leaders of the minority who opposed the declaration of papal infallibility on the ground that such a declaration was inopportune; but after the definition he was one of the first among its former opponents to make submission. In the siege of Paris by the German armies he won universal approval for his devoted labors in relieving the wounded and succoring the distressed; and when the Communists, known to be his mortal foes, came into control of the city, he refused to seek safety outside the walls. Arrested by the Commune and held as a hostage, he with other hostages was fusilladed to death in the yard of the prison of La Roquette. The end came while he was in the attitude of blessing his assassins and invoking forgiveness for them. His body was recovered with difficulty and was buried with imposing ceremony at the public expense on 7 June 1871. It was not a mere accident or coincidence that he was the author of a 'Life of Saint Thomas à Becket' (1859), that archbishop of Canterbury, who was slain by assassins before the high altar of his cathedral church 700 years before; within 23 years he had seen his two nearest predecessors, archbishops of Paris, murdered, one by an individual assassin, the other (Affre) by the insurgent populace. In addition to his scholarly work, 'The Life of Saint Thomas à Becket,' he wrote a new translation of 'Dionysius the Areopagite,' and also a translation of the 'Imitation of Christ'; 'Women of the Bible' (8th ed., 1876); 'Holy Women' (4th ed., 1877). Consult the biography by Foulon (Paris 1889) and Guillermin (ib. 1888).

DARBY, John Nelson, founder of the Brethren: b. London 1800; d. 1882. In 1819 he was graduated at Trinity College, Dublin, and was called to the Irish bar in 1825. He left the Church of Ireland because of conscientious scruples, believing that denominational distinctions and a regular ministry should be discarded. He formed an association in Dublin in 1828. Another was organized soon after in Plymouth, and the fact that Providence Chapel was the first regular place of meeting gave the name Plymouth Brethren to the sect in 1830. Darby labored as an evangelist in England and on the Continent until his death in 1882. He preached in English, French and German, and for many years edited the *Christian Witness*, the official organ of the Brethren. His collected writings were published in 32 volumes (London 1867–83).

DARBY, Pa., borough of Delaware County, on the Darby River, the Baltimore and Ohio and the Philadelphia, Baltimore and Washington railroads, five miles southwest of Philadelphia. It has silk, cotton, woolen and worsted mills and manufactures filters, tanks and tools. It has also a public library which dates from 1743, a Friends (Quaker) meeting house and cemetery established in early Colonial times. The borough was first settled about 1660. Pop. 6,305.

DARBY AND JOAN, the names of a married couple traditionally reported to have lived in the West Riding of Yorkshire in the 18th century, remarkable for their long and happy life together. A ballad entitled 'The Happy Old Couple,' by Henry Woodfall, former apprentice to the printer John Darby, commemorates their excellencies. Humdrum, uneventful married life is sometimes referred to as a «Darby and Joan» existence.

DARBYITES, a name often applied to the Plymouth Brethren (q.v.) from their principal founder, John Nelson Darby (1800–82), of whose collected writings 32 volumes have appeared (London 1867–83). Consult his 'Personal Recollections' (ib. 1881).

DARBYSHIRE, Alfred, English architect: b. Salford, Lancashire, 20 June 1839; d. 5 July 1908. He began the practice of his profession in 1862 at Manchester and designed many buildings of importance there and elsewhere. His principal literary works are 'Experiences of an Architect, Professional, Artistic, and Theatrical'; 'A Book of Old Manchester and Salford.'

DARCET, där-sā', **Jean,** French physician and chemist: b. Douazit, 7 Sept. 1725; d. Paris, 13 Feb. 1801. He accompanied the celebrated Montesquieu to Paris in 1742, and remained with him till his death as a literary assistant. He afterward devoted himself to chemistry, especially to technical chemistry, was appointed professor of chemistry in the College of France, and regent of the medical faculty. Darcet made many experiments with a view to the improvement of the manufacture of porcelain. He also tried the effect of fire on the various kinds of earths, and demonstrated the volatility of the diamond. In 1776 he published a memoir on the geology of the Pyrenees. He succeeded Macquer as a member of the Academy of Sciences and director of the manufactory of Sèvres. He was afterward appointed inspector-general of the assay of coin and inspector of the Gobelin manufactory. He made several important chemical discoveries, and contributed much to the present improved state of the science. A fusible alloy of lead, bismuth and tin is named after him. He published several works describing his discoveries.

DARCET, Jean Pierre Joseph, French chemist: b. Paris, 31 Aug. 1777; d. there, 2 Aug. 1844. He was a son of Jean Darcet (q.v.). He began his chemical studies early with his father and with Vauquelin. In his 24th year he was made assayer of the mint, and from that time devoted his time chiefly to chemistry in its application to the arts. Being employed by the government in the manufacture of gunpowder, he rendered its preparation much more easy by new processes. He greatly assisted in extending the manufacture of soda artificially, succeeded in producing alum equal in quality to that of Italy, brought the art of stereotyping to greater perfection, facilitated the preparation of sulphuric acid, investigated the best alloys for cannon, for cymbals and tam-tams and for statues, etc. Among his other discoveries were the extraction of soda from chestnuts, the preparation of sugar from the same material and the extraction of jelly from bones by means of an acid. He also made another discovery of the means of protection against the fine dust of quicksilver, which had been so injurious to the gilders. Darcet's discovery completely attained the object and gained him the prize of 3,000 francs which Ravrio had offered for this discovery.

DARDANELLES (ancient HELLESPONT), a narrow channel in the Turkish dominions, which connects the Sea of Marmora with the Ægean Sea and separates Europe from Asia. It is about 42 miles in length, varying in breadth from 1,400 yards to five miles. There is always a rapid current in the channel, the volume and velocity of which is much increased by the prevailing winds, which blow in the same direction with the stream for at least 10 months in the year. The modern name of this strait is derived from the castles, called the Dardanelles, built on its banks, at its southwest entrance; its ancient name, Hellespont, from Helle, daughter of Athamas, king of Thebes, who was fabled to have been drowned in it. Xerxes on his great expedition against Greece, in 480 B.C., crossed this strait by means of two bridges of boats, constructed in the neighborhood of Sestos and Abydos. It is also renowned as the scene of the death of Leander, who, it is said, used to swim across from Abydos on the Asiatic side, at the narrowest part of the strait (but yet about a mile in width), to visit Hero of Sestos on the European side. This feat of swimming the channel was also performed by Lord Byron, who achieved it in 1 hour and 10 minutes. To protect Constantinople, coast batteries have been built since 1867, on both the Asiatic and the European side. These batteries have latterly been supplied with ordnance of recent type, such as the guns made by Krupp, and strengthened under German supervision. In 1770 the Turkish defenses were almost in ruins. Warned by the condition of the batteries when a Russian squadron appeared before the castles, the Turkish government ordered the defenses repaired; but they were again allowed to become almost useless until 1807. In that year a British squadron passed the Dardanelles and appeared before Constantinople, which until then had never seen an enemy's fleet. In 1854, during the Crimean War, the castles and other defenses of Constantinople were again put in repair. It had long been recognized that the Turks had a right to prevent any foreign ship of war from passing the Dardanelles, and in 1841 a treaty was signed between the five great European powers and the Porte, in which it was laid down that this was not to be permitted. The treaty was confirmed in 1856, the Sultan, however, retaining the right to permit certain vessels belonging to foreign governments to pass. By the Berlin treaty of 1878 the duty was again imposed upon the Sultan to prevent the passage of any foreign ship of war. This arrangement was modified in 1891, when Russia secured right of passage for her «volunteer fleet.»

For the Allied campaign in the Dardanelles, see WAR, EUROPEAN.

DARDANUS, där'da-nŭs, in mythology, the progenitor of the Trojans, and so of the Romans, and the son of Zeus and Electra, the daughter of Atlas. He emigrated from Samothrace (according to some accounts, from Arcadia, or Crete) and settled in Phrygia in the country which was afterward called Troas. Here he built a city, which, from him, was called Dardanum, or Dardanus, and introduced the worship of Athena (Minerva).

DARDISTAN, där'dĭs-tän, the name given to a region of central Asia, bordering on Baltistan, the northwest portion of Cashmere. This country, which consists of lofty mountains, is little known, and its limits are variously given; but its interest depends mainly on the fact that its inhabitants, the Dards, are an Aryan people, speaking a Sanskritic tongue mixed with Persian words. They have been called «Stray Aryans in Tibet,» and are Moslems converted from Buddhism at a comparatively recent period. The rajah of Cashmere is constantly endeavoring to subject them completely to his authority. The chief districts are Hasora, Gilghit and Tassin; some authorities also include Chitral in Dardistan.

DARE, Virginia, first child of English parents in the New World: b. Roanoke, August 1587, and named after the district of Virginia. She was the granddaughter of John White, who was governor of the colony sent by Sir Walter Raleigh to found an agricultural state, which sailed from Plymouth, 26 April 1587, and reached the shores of Virginia in July of the same year. White's daughter was married to Mr. Dare, who was one of the assistants of the governor, and Virginia was born about a month after the arrival of the expedition.

DARFUR, där'foor, or **DARFOOR** (Country of the Fur, a tribe of negroes), a region of central Africa, occupying a large portion of the area between Abyssinia and Bornou and forming part of the Egyptian Sudan. It may be considered as lying between lat. 10° and 16° N. and long. 22° and 28° E.; area 150,000 square miles. On the east it has Kordofan; on the west, Wadai; on the north, the desert; while the regions to the south are occupied by barbarous nations. The most important physical feature is the Djebel Marrah, a chain of mountains near the centre of the country, of a crescent form, lying north and south and reaching the height of 6,000 feet. Some of the peaks are extinct volcanoes. There are other subordinate chains and elevated masses. There seem to be no permanent streams, the watercourses being filled only temporarily. The country belongs mainly to the Nile basin, partly to that of Lake Chad. Large portions of it are barren or are covered with verdure only in the rainy season. The inhabitants are of various races, some of them of the negro type, others having little of the negro character, and a considerable number being Arabs. The Fur or For, who give name to the country, inhabit the mountainous central parts and are a brownish-black color with negro features. Mohammedanism is the religion of the country, and to it is due what little civilization the people possess; but the natives are still semi-barbarous. Their occupation is chiefly agriculture. A few of the mechanical arts are carried on, and in particular the people manufacture a considerable variety of articles, including cotton goods, pottery, leather, lance-heads, etc. Their houses are rudely constructed of clay and reeds, and with scanty accommodation. Among the exports the most important are camels, ivory, the horns, teeth and hide of the rhinoceros and hippopotamus, ostrich feathers, gum and copper. The imports comprise beads, glass, arms, light cloths of different kinds, silks, shoes and other manufactured articles. Darfur was an independent kingdom till annexed by Egypt in 1874. During the ascendency of the Mahdi and his successor it was independent; but it is now recognized as within the «sphere of influence» of Great Britain. In 1898 it was made a part of the Anglo-Egyptian Sudan. The hereditary sultan manages the internal affairs. The capital is El Fâsher. Pop. 4,000,000.

DARGAN, Edmund Spawn, American jurist: b. Montgomery County, S. C., 15 April 1805; d. Mobile, Ala., November 1879. He was the son of a Baptist minister of Irish descent, at whose death he was left without means. By his own exertions, he obtained a fair knowledge of English, Latin and Greek, although he was at work on a farm until he was 23 years old. He read law, was admitted to the bar in 1829, went to Alabama and taught three months in Washington, Autauga County. Here he was elected a justice of the peace and filled the office for several years, meanwhile engaging in the practice of law. In 1833 he removed to Montgomery and in 1841 was elected to the bench of the Circuit Court of the Mobile district and removed to Mobile. He resigned the office of judge in 1842 and in 1844 was elected to the State senate. He was also mayor of Mobile the same year. He resigned from the senate the following year and was elected to Congress, where he served from December 1845 to March 1847. On the question of the northwest boundary of Oregon he made an able speech and offered some valuable amendments to the resolution of notice. He was the first to propose the line of adjustment finally adopted on the settlement of the question with the British government. He declined a renomination and in 1847 was elected to fill a vacancy in the Supreme Court of Alabama. In 1849, by the resignation of Justice Collier, he became chief justice, which office he resigned in 1852 and resumed the practice of law in Mobile. In 1861 he was a delegate to the State convention and voted for the ordinance of secession. He also served for one term as a representative in the Confederate Congress.

D'ARGENSON, dăr-zhäñ-sôñ, **Marc Pierre**, Comte, French statesman: b. 1696; d. Paris 1764. He was the younger son of the Marquis d'Argenson (1652–1721), who created the secret police and established the *lettres de cachet*. He became War Minister in 1743, at a time when the political existence of France was imperiled and by his vigor and lucky choice of generals changed the fortunes of the war in the course of a single year. After the peace of Aix-la-Chapelle (1748), he devoted himself to the improvement of the military system and in 1751 established the École Militaire. He was an illustrious patron of literature. Diderot and D'Alembert dedicated to him their great 'Encyclopédie' and to Voltaire, whose fellow-student he had been, he furnished materials, gracefully acknowledged in the dedication, for his 'Siècle de Louis XIV.' In 1757 he was banished to his estate by the machinations of Madame Pompadour; but on her death he returned to Paris.

DARGOMYZHSKY, dăr'go-mizh'skē, **Alexander Sergeyevich**, Russian composer: b. Tula 1813; d. Saint Petersburg 1869. Having made his preliminary studies, in which he exhibited great precocity, he removed to Saint Petersburg in 1835 and thereafter made his home in that city. He had previously met Glinka, and helped him in producing 'The Life of the Tsar,' in the course of which work Dargomyzhsky obtained a sound knowledge of and training in orchestration. At the capital he soon became known by his opera, 'Esmeralda' (1839) in which he followed the traditions of Rossini and Auber, both of whom were then at the pinnacle of their fame. In 1847 'Esmeralda' was produced at Moscow. It was followed in 1855 by 'Russalka,' which at length brought him fame. In 1867 he was made president of the Russian Musical Society and during his later years his home became the centre of the modern Russian school, which looked for inspiration to Schumann, Berlioz, Wagner and List. He next wrote the opera, 'The Stone Guest,' to Pushkin's tale of the same name, but did not live to complete it. Four years after his death it was produced with great success. He composed also fantasias for orchestra, notably 'Finnish Fantaisie'; 'Bala-Yaza'; and 'Kazachok'; and several ballads. His later years were also devoted to the training of promising singers, of which he practically created a new school. Consult Cui, 'La musique en Russie' (Paris 1880) and Pougin, 'Essai historique sur la musique en Russie' (Turin 1897).

DARIC, dăr'ĭk, properly **DARICUS** (Gr. δαρεικος), an ancient Persian coin of pure gold, specimens of which are still preserved in several European collections, bearing on one side the image of a kneeling archer, on the other that of a royal palla. It was known to the Greeks, Romans and Jews; the latter used it after the Babylonian captivity, under the reign of the Persians, and called it *adarkon* or *darkemon* (mentioned in the first book of Chronicles, by Esdras and Nehemiah). Its value was equal to 20 silver drachmæ, or 16 shillings 3 pence; 3,000 being equal (according to Xenophon) to 10 talents. Its name is variously derived from that of King Darius Hystaspes, who regulated the Persian currency, and from several Persian words meaning king, palace and bow. The so-called silver darics were not designated by this name in antiquity.

DARIEN, Ga., city, county-seat of McIntosh County, on the Altamaha River and the Georgia Coast and Piedmont Railroad, about 65 miles southwest of Savannah and about 10 miles from the ocean. It exports large quantities of pine lumber, crossties, handles, rice, fish and garden produce. Settled in 1736, Darien was incorporated as a town in 1816 and was chartered as a city in 1818. It is governed by a board of five aldermen selected by the grand jury, one of the five being chosen mayor. The waterworks are owned by the city. Pop. 1,391.

DARIEN (Sp. dä-rē-ān'), **The Colony of**, established by the Spaniards on the Gulf of Urabá (see Darien, Gulf of), in the first decade of the 16th century, was the centre from which exploring expeditions were sent out until Panamá was founded in 1519. A notary of Triana, named Bastidas, sailed along the Caribbean coast of the isthmus in 1501, Balboa being one of his companions. At the end of 1502 and beginning of 1503 Columbus carefully examined the region immediately west of this gulf. In 1508 the king granted to Nicuesa the territory from the Gulf of Darien to Cape Gracias á Dios; to Ojeda, the territory from the Gulf of Darien to Cape de la Vela. The dividing line was more precisely fixed by the grantees, who agreed that it should be the Atrato River. (See Darien, Gulf of). In that event the only permanent settlements were made near this river and the gulf into which it flows. Ojeda first landed at Cartagena (1509), where his expedition endured great hardships. Removing thence to the eastern side of the Gulf of Urabá, he built the fort called San Sebastian, which he entrusted to Francisco Pizarro, and then returned to the West Indies. Pizarro, Balboa and all who remained alive set sail for Cartagena once more. There they were met by Enciso, with re-enforcements from San Domingo, and after some hesitation, crossed the gulf to the western shore, where the colony of Santa Maria de la Antigua del Darien was established in 1510. Balboa gained ascendency by recommending the selection of this place (which he had visited with Bastidas) and became the leading spirit in the undertakings which followed — the expedition to Dahaiba, the crossing of the isthmus, etc. (see Balboa).

Nicuesa's expedition, though it started under brighter auspices, resulted in a lamentable failure. Its courtly leader, after losing nearly all his followers near Cape Nombre de Dios, was forced to put to sea in a boat that could not outlive a single storm — practically condemned to death by the authorities at Darien, whom he had offended. In 1514 Pedrarias Davila superseded Balboa as governor. Five years later Panamá was founded; the capital was established on the Pacific coast; exploration northward and southward began along the shores of the newly-discovered ocean; the isthmian traffic sought and found an easier route, better harbors and a less deadly climate at a distance from the Gulf of Urabá. Darien was abandoned. Consult Anderson, Dr. C. L. G., 'Old Panama and Castilla del Oro.' See Central America.

DARIEN, Gulf of, also called **The Gulf of Urabá,** an extension of the Caribbean Sea forming a wedge-shaped indentation in the northern coast of Colombia; of great width between Colón and Cartagena, but narrowing toward the south until it becomes an estuary of the Atrato River. A distinction to be commended on the ground of convenience is that which would restrict the name of Urabá to the southern portion, which is about 7 miles wide by 30 long. Some of the earliest Spanish settlements, at the beginning of the 16th century, were located on the Gulf of Urabá (see Darien, the Colony of); the region has not prospered, however, owing to the lack of good harbors; to the extremely unhealthful, hot and damp climate of the coast at this point; and the diversion of traffic to Colón via the Panama Canal.

DARIEN, Isthmus of, the neck of land uniting South and Central America; more specifically, the lower portion which is narrowed between the gulfs of Urabá and San Miguel, while its prolongation on the northwest, between the Caribbean Sea and the Gulf of Panamá, is called the Isthmus of Panamá, now traversed by an interoceanic canal, known as the Panama Canal (q.v.). It is traversed by the Cordillera de Baudó. Its principal rivers are the Tuira (also called Darien), which rises in the heights of Aspaves, receives the waters of a number of tributaries and flows into the Gulf of San Miguel, and the Atrato, which comes out of the department of Cauca and empties into the Gulf of Urabá. In regard to the climate on the coast, see Darien, Gulf of. A Colombian official publication says: «The interior of the Isthmus of Darien is very sickly and only the negroes and Indian half-breeds can stand its excessively rainy climate, hot and damp, and its atmosphere, which the marshes make malarious. Though about the Darien cordillera the temperature is milder, it cannot be said that the region is salubrious; and it will never be until the great woods and groves shall have disappeared.» The woods in question, especially in South Darien, are of excellent quality and colossal growth, constituting a source of wealth. Gold is obtained from the rivers Balsas and Marca, and the mines of Cana or Espiritu Santo, near the Tuira River, were famous in the old days. For other natural resources, etc., see Panamá, Republic of; for historical sketch, see Darien, the Colony.

DARIEN RIVER, the name sometimes given to two streams in the Republic of Colombia: (1) A river emptying into the Gulf of Urabá, on the banks of which Balboa and others founded in 1510 the town of Antigua del Darien (see Darien, the Colony); (2) the Tuira River (see Darien, Isthmus of).

DARIEN SCHEME, a celebrated financial project, conceived and set afloat by William Paterson (q.v.), a Scotchman, toward the close of the 17th century. On his original and ostensible design of establishing an East India trade in Scotland he ingrafted the secret and magnificent plan of forming an emporium on each side of the Isthmus of Darien or Panama for the trade of the opposite continents. According to his idea the manufactures of Europe were to be sent to the Gulf of Darien and thence conveyed by land across the ridge of mountains that intersect the isthmus, where they were to be exchanged for the produce of South America and of Asia; and thus, to use his own emphatic language, he would wrest the keys of the world from Spain. In order to attract encouragement and support he proposed to render his settlement a free port and to banish all distinction of party, religion or nation. Now Scotland was at this time very poor and Paterson went to London to procure subscriptions, which soon ran up to the amount of $1,500,000. But alarm, first excited by the East India Company and the West India merchants, soon spread over the whole English nation and the English subscriptions were withdrawn. Yet Paterson himself was not to be easily intimidated; and Scotland, indignant at the opposition which the plan had met with in England, avowedly because it would be beneficial to the Scotch, immediately subscribed $2,000,000, although at that time there was not above $4,000,000 of cash in the kingdom. Only a little more than half of the subscriptions, however, were ever paid up. Besides this sum, $1,500,000 was subscribed at Hamburg, which, however, was withdrawn in consequence of the threatening memorial presented by the English resident to the senate of that city. The Scotch, nevertheless, persisted in their scheme; five large vessels, laden with merchandise, military stores and provisions, with a colony of 1,200 persons, sailed for the Isthmus of Darien, which they reached after a voyage of about four months.

The settlement was very judiciously formed at Acta, a place at an equal distance between Porto Bello and Cartagena. Here is a secure and capacious harbor, formed by a peninsula which the colonists fortified and named Fort Saint Andrew. To the settlement they gave the name of New Caledonia. For eight months the colony bore up against accumulated misfortunes and persecutions, but at the end of this period those who survived were compelled by disease and famine to abandon their settlement and return to Europe.

Before this circumstance was known two other expeditions sailed from Scotland and the information of the abandonment of the first colony only served to arouse the Scotch nation to more determined perseverance in the plan. When the second expedition arrived they found the huts burned and the forts demolished; famine and disease assailed them; they were attacked by the Spaniards from Panama — these they repulsed, but a larger force coming from Cartagena obliged them to capitulate, on condition that they could embark with their effects for Europe; few, however, of these survived to return to Scotland.

In order to pave the way for a better understanding between the two countries the lords commissioners for England agreed in 1706 to purchase the shares of the particular members of the Darien Company. A full account of the Darien expedition is to be found in the second volume of Sir John Dalrymple's 'Memoirs of Great Britain and Ireland.' The best recent authority on the subject is John Hill Burton, 'History of Scotland' and 'Darien Papers.' Consult also Sir Walter Scott's 'Tales of a Grandfather' for a most interesting but rather one-sided narrative.

DA RIMINI, Francesca, dä-rē'mē-nē, an Italian lady of the 13th century, the daughter of Guido da Polenta of Ravenna. She was married to Giovanni Malatesta da Rimini, a cripple, but loved his brother Paolo. Giovanni surprised the lovers at one of their meetings and killed them both (about 1285). Their story is told in Dante's 'Inferno' and is the subject of Leigh Hunt's poem 'The Story of Rimini,' and of the dramas 'Francesca da Rimini' by D'Annunzio, and 'Paolo and Francesca' by Stephen Phillips. Fuseli made the story the subject of a well-known painting.

DARÍO, Rubén, Nicaraguan poet: b. 1867; d. Leon, Nicaragua, 7 Feb. 1916. He was of mixed Indian and Spanish blood, and the blending of these two strains produced in him a literary temperament very different from that of Spanish writers born and educated in Spain. Darío had much in common with the Mexican Indian poets Altamirano and Ramírez and the novelist and dramatist Mateos, all three of whom were noted orators. In him the fervid aboriginal blood predominated over the Spanish; and in the days of his literary activity his became the voice of the native-born crying out «America for the Americans.» At this time his vision was foreshortened to such an extent that, if he did not actually hate the people of non-Latin tongue occupying the territory to the north of Spanish America, he found little place for them in the American policy of which he had made himself the mouthpiece. But he eventually came under the influence of Santos Chocano (q.v.), who had already begun to see with a far-reaching and clear vision the interdependence of Saxon and Latin America. Darío was a man of wonderful adaptability, which enabled him to gather his experiences, his sentiments and his information from the most varied and incongruous sources, to weigh and judge them and to select from them, instinctively, those that fitted into his program. Soon he began to blow on his trumpet almost as loudly as Santos Chocano had done, announcing himself as the herald of the natural unity of all the races living on the American continents. This was done in the face of a host of writers of lesser talent who could see nothing good in the United States or in the people of English tongue. Yet Darío never became the poetical champion of English-speaking America that Santos Chocano long has been. His was more of a borrowed sentiment, for his interests, education and associations had always been and continued to remain Latin.

Leaving home quite early in his career Darío went to Argentina, where he attracted attention through his daring literary innovations, his poetical fervor, the beauty of his style and the vividness of his imagination. Soon his became a name to conjure by in Argentina, where a very active school of younger writers gathered about the prophet of Americanism in literature and art, as Darío began to be called. All of Latin-America began to pay attention to the new voice; Darío's poems began to appear in high class Spanish magazines in Madrid and translations of them in the periodicals of Paris. The young poet was appointed Nicaraguan Minister to Madrid and he became a sort of literary lion in the Spanish capital, where the younger literary set, especially the Latin-Americans resident in Europe, gathered about him as they had done in Argentina. From Madrid Darío went to Paris, where he continued to be the literary leader of Latin-America. As editor of *La Revista Mundial* he exercised a strong literary influence apart from his poetical efforts. Shortly after the outbreak of the European War Darío, broken down in health, visited New York, where he read an 'Ode to Peace' before the students and faculty of Columbia University. From there he went to Guatemala, where he was enthusiastically received. But, unable to stand the fatigue of public receptions, he was hurried to Nicaragua in a dying condition.

Although not 50 years old at the time of his death Darío had been, for a quarter of a century, the foremost literary figure in Latin-America. His genius was naturally cosmopolitan, and his long residence in Argentina, Madrid and Paris largely accentuated this cosmopolitanism. Literary and scientific reciprocity between all the countries of the Western hemisphere he saw coming in the not distant future, and he was clear-sighted enough to see that Latin-America was destined to get more out of it than English-speaking America. In Poe, Whitman, Longfellow and Hawthorne he recognized spirits kindred to those of Latin-America yet different; and from all of them he borrowed forms of metre and inspiration, and from them he learned to remodel the conventional Spanish rhythm and to give it new forms and greater life and variety. But though he carried the flag of reform yet few Spanish poets have been truer and more fervid interpreters of Latin life and culture than Darió, who had drunk deeply at the fountains of the two mothers of the Latin races.

Darío's first noted success, 'Azul,' a volume composed of fervid verse and passionate prose, published in Valparaiso, Chile, in 1888, brought him into almost instant notice. Here he worships at the shrine of beauty and elegance and he turns his back upon the excesses of the naturalistic school with all its crudeness and ugliness. He preached the beauty of language and the musical quality of words; and his strongly poetical and sensitive nature enabled him to exemplify in his own work his new gospel, which the poets of Latin-America and not a few in Spain are still preaching. 'Prosas Profanas' (1896) shows a great improvement in Darío's power and art, for in the meantime he had been in Spain in an official capacity and had made his entrée into Spanish literature, and in Paris, where he had become a well-known figure in literary circles and had imbibed much of the French literary spirit. 'Prosas Profanas,' in which Darío attempts many innovations and preaches his literary ideals, became the textbook of the younger literary Latin-American generation, who acknowledged him as their master. Among his other published works are 'Los Raros'; 'Cantos de Vida y Esperanza' (1905); 'El Canto errante' (1907). Consult Coester, A., 'The Literary History of Spanish America' (New York 1916); González Blanco, A., 'Rubén Darío' (Madrid 1910, preface to the 3 vol. ed. of Darío's works).

John Hubert Cornyn,
Editorial Staff of The Americana.

DARIUS, da-rī'ŭs, the name of several Persian kings, or, according to some writers, the royal title itself. Among the most distinguished individuals of this name are:

1. Darius I, fourth king of Persia: b. about 558 B.C.; d. 485 B.C. He joined the conspiracy against the False Smerdis, who had possessed himself of the Persian throne. After the conspirators had succeeded in getting rid of the usurper, they agreed to meet early the next morning, on horseback, and to appoint him king whose horse should neigh first after sunrise. The groom of Darius, apprised of this project, led his master's horse in the night with a mare to the appointed place, and, in consequence of this stratagem, the horse of Darius neighed first the next morning. Darius was therefore saluted king, and the nation approved the choice. His reign was marked by many important events. The city of Babylon revolted, partly on account of burdensome impositions of tribute and partly because the royal residence, under Cyrus, had been transferred thence to Susa. Darius besieged the city nearly two years without success, and was on the point of abandoning the siege when Zopyrus, one of his generals, by a heroic sacrifice, placed the city in his possession. After the subjection of Babylon Darius undertook an expedition, with an army of 700,000 men, against the Scythians on the Danube, who enticed him so far into their inhospitable country by their pretended flight, that he succeeded with difficulty in extricating himself and his army, after suffering great losses. Leaving a part of his forces under the command of Megabyzus in Thrace, to conquer that country and Macedonia, he returned with the remainder to Asia, to recruit at Sardis. In the year 501 B.C. a disturbance at Naxos, in which the Persians had taken part, occasioned a revolt of the Ionian cities, which the Athenians endeavored to promote, but which was suppressed by the capture and punishment of Miletus in 496. To revenge himself upon the Athenians, Darius sent Mardonius with an army, by the way of Thrace and Macedonia, against Greece, and prepared a fleet to make a descent upon its coasts. But his ships were scattered and destroyed by a storm in doubling Mount Athos and the army was almost entirely cut to pieces by the Thracians. Darius, however, collected another army of 500,000 men and fitted out a second fleet of 600 ships. Naxos was conquered, and Eretria, in Eubœa, sacked. Thence the army under Datis and Artaphernes proceeded to Attica and was led by Hippias to the plains of Marathon. The Athenians had in vain besought assistance from their neighbors, and were obliged to depend upon their own resources alone. They marched forth, 10,000 strong, under the command of Miltiades, to meet the Persian army, and animated by the reflection that they were fighting for freedom and their country, obtained a complete victory (490 B.C.). This prince did much to improve the internal administration of his kingdom. In the year 508 B.C. he sent his admiral, Scylax, to explore the river Indus, and he encouraged commerce and arts by useful institutions and laws. Inscriptions on the great rock of Behistun give an account of the events of his reign. They have been compiled by Tolman, 'The Behistun Inscription of King Darius' (Nashville 1908).

2. Darius II, king of Persia (surnamed Nothos, or the Bastard, by the Greeks): d. 404 B.C. He was an illegitimate son of Artaxerxes I (Longimanus). He ascended the throne in 423 and suppressed several rebellions of his satraps; but Amyrtæus succeeded in maintaining himself in independent possession of Egypt, which had revolted in 414. His son Cyrus is familiar to us through Xenophon's 'Anabasis.'

3. Darius III, king of Persia (surnamed Codomannus). He was the great-grandson of Darius II, and the 12th and last king of Persia. He ascended the throne 336 B.C., when the kingdom had been weakened by luxury and the tyranny of the satraps under his predecessors and could not resist the attacks of a powerful invader. Such was Alexander of Macedon, and the army sent against him by Darius was totally routed on the banks of the Granicus, in Asia Minor. Darius then advanced with 400,000 soldiers to the plains of Mesopotamia. The Grecian mercenaries advised him to await the enemy here, as the level country would enable him to draw out his forces to advantage; but Darius hastened forward to meet Alexander in the mountainous Cilicia. Darius was a second time totally routed, near the Issus 333 B.C. He himself escaped, under cover of the night, to the mountains. His mother, his wife and three of his children fell into the hands of the conqueror, who treated them with great generosity. Darius was so far from being discouraged by these defeats that he wrote a haughty letter to Alexander, in which he offered him a ransom for the prisoners, and invited him to a new engagement, or, if he did not choose that, granted him permission to retire into Macedonia. Alexander then laid siege to Tyre, on which Darius wrote him another letter, offering him not only the title of king, which he had before refused to do, but also 10,000 talents ransom and all the countries of Asia as far as the Euphrates, together with his daughter, Statira, in marriage. These propositions, however, were unavailing. Alexander subjected Egypt and the two armies met between Arbela and Gaugamela, and after a bloody engagement Darius was compelled to seek safety in flight (331 B.C.). Alexander took possession of his capital, Susa, captured Persepolis and reduced all Persia. Darius fled to the northern provinces, where he was seized by Bessus, one of his satraps, and afterward murdered. Consult Justi, 'Grundriss der iranischen Philologie'. (Strassburg 1897).

DARJEELING, British India, town and capital of the district of Darjeeling, in Bengal, at over 7,000 feet elevation on the slopes of the Sikkim Himalayas. The Rajah of Sikkim ceded it to the British in 1835 and by the latter it has been converted into a sanitary station, being equipped with a modern sanitarium, botanical gardens, bazaars, etc. It is the summer residence of the lieutenant-governor of Bengal, and has become a popular health resort. Tea is extensively grown nearby. Pop. 17,053.

DARK AGES, The, a period supposed to extend from the fall of the Roman Empire, 475 A.D., to the revival of literature on the discovery of the Pandects at Amalfi in 1137. Not to draw the limits too finely, say 700 years (450 to 1150). The Middle Ages may be extended to about 1550, covering from 10 to 11 centuries.

DARK AND BLOODY GROUND, The, a name frequently applied to the State of Kentucky. It is said to be a translation of the Indian words «Kain-tuk-ee,» though some authorities claim that they signify «At the head of the river.» The epithet was originally bestowed because the region was the scene of many sanguinary conflicts between the redmen of the northern and southern tribes. Later the constant feuds between white settlers and the aborigines rendered the phrase peculiarly appropriate to this locality.

DARK DAY, a name frequently used in this country in connection with 12 May 1780, but applied also to days on which similar phenomena have been discerned. On the date mentioned the atmosphere in New England was so obscure as to cause in some places cessation from outdoor labor. Birds and domestic fowls acted as during an eclipse. The darkness began at 10 and lasted until night, causing a feeling of alarm by its unprecedented nature. There appears to have been an absence of clouds for the most part, though light rain occurred. Though known as the Black Friday of New England, the area covered by darkness also extended west of that section. Two dark days are recorded as occurring in America earlier than the Black Friday, one in 1716 and another in 1762. The Dark Days of Canada were 16 Oct. 1785 and 3 July 1814. On the latter date the darkness extended over a tract estimated to be about 300 miles in length and 200 in breath, in the region of the Saint Lawrence River and Gulf. There were showers of sand and very dark ashes and the atmosphere was of a deep yellow color. The characteristic features seemed to point to volcanic action as an origin rather than to forest fires. These two causes have in recent years received much attention in their relation to the obscuring and tinting of the atmosphere over immense areas. The smoke from great forest fires in the northwestern States and in Canada was in 1881 carried south or southeast to almost incredible distances, and in June 1903 extensive fires in the forests of New England and of the Adirondacks caused a yellowish haze that extended far from its source. After the volcanic eruptions of Mount Soufrière and Mount Pelée in May 1902 vast quantities of volcanic dust were borne seaward, more or less obscuring the daylight by their persistence in the atmosphere. The volcanic dust from Krakatoa is believed to have encircled the entire earth and to have affected the color of the atmosphere for months. In countries situated like Egypt a marked obscuration of daylight may often be accounted for by the fine sand brought by winds from the desert.

DARK HORSE, a phrase used in racing concerning a horse when its power of performance or chances of success are not generally known. The expression has been transferred to fields of human competition, and is frequently used in politics, especially in reference to candidates for nomination in a convention when they are unexpectedly brought forward or draw a following that had not been anticipated.

DARKE, William, American soldier: b. Pennsylvania 1736; d. Jefferson County, Va., 26 Nov. 1801. At 19 he served with the Virginians in the battle of Braddock's defeat, and afterward in the war of the American Revolution. At Saint Clair's defeat he commanded the left wing of the army and made two gallant and successful charges with the bayonet, in the second of which his youngest son, Capt. Joseph Darke, fell mortally wounded (4 Nov. 1791). He was repeatedly a member of the Virginian legislature, and, as member of the convention of 1788, voted for the Federal Constitution.

DARLASTON, England, town in Staffordshire, included in the parliamentary borough of Wednesbury. It is an irregular, straggling place, in which there are blast furnaces and iron manufactures. In the vicinity there is abundant coal and iron. Pop. 17,107.

DARLEY, Felix Octavius Carr, American artist: b. Philadelphia, Pa., 23 June 1822; d. Claymont, Del., 27 March 1888. His illustrating of literary masterpieces gave pleasure to thousands and made him famous. His best work comprises his drawings to accompany the text of ‹Rip Van Winkle›; ‹Sleepy Hollow›; ‹Courtship of Miles Standish›; ‹Scarlet Letter›; ‹Evangeline›; the novels of Cooper, Dickens, and others, besides many special pictures. His book ‹Sketches Abroad with Pen and Pencil› (1868) is well known. His water-color paintings of incidents in American history are full of spirit and his bank-note vignettes are also worthy of mention. Consult F. Weitenkampf ‹American Graphic Art› (New York 1912).

DARLEY, George, English poet and critic: b. Dublin 1795; d. London 1846. He was graduated at Trinity College, Dublin, in 1811, went to London in 1825, and became attached to the *Literary Gazette* and *Athenæum* journals, in which his criticisms of poetry and the fine arts made him well known. He is the author of the ‹Labors of Idleness› (1826); ‹Sylvia› (1827), and miscellaneous works of a mingled philosophical and poetic character.

DARLING, Flora Adams, American novelist: b. Lancaster, N. H., 1840; d. 6 Jan. 1910. She married Edward Darling, a Confederate officer, killed in the Civil War. She was one of the founders of the society of Daughters of the Revolution and was prominent in that and other patriotic organizations. She published: ‹A Wayward, Winning Woman› (1890); ‹Was It a Just Verdict?› (1890); ‹The Bourbon Lily›; ‹Mrs. Darling's Letters, or Memories of the War› (1894); ‹A Social Diplomat› (1898); ‹History D. A. R. and D. R. Societies of Patriotic Organizations› (1901); ‹The Senator's Daughter,› etc.

DARLING, Grace Horsley, English heroine: b. Bamborough, England, 24 Nov. 1815; d. 20 Oct. 1842. She was the daughter of the keeper of the Longstone Lighthouse. The event which made her famous occurred on 7 Sept. 1838. The steamer *Forfarshire* was wrecked near the lighthouse, and at daylight William

DARJEELING, INDIA, SHOWING THE HIMALAYA MOUNTAINS

Darling descried the wreck from Longstone, but, accustomed to scenes of danger as he was, shrank from attempting to reach the steamer through a boiling sea in a boat. His daughter, who could see, by the aid of a glass, the sufferers clinging to the wreck, implored him to let her accompany him in the endeavor to relieve them. At last he consented; and father and daughter reached the wreck, and found nine sufferers, whom they succeeded in bringing to the lighthouse. The news of the heroic deed soon spread, and a purse of $3,500 was quickly subscribed and presented to the brave girl.

DARLING (so called from SIR RALPH DARLING, a governor of New South Wales), a name of several applications in Australia. (1) The Darling River, a river rising in southeast Queensland, is formed by the junction of several streams, and flows through New South Wales in a southwesterly and southerly direction till it joins the Murray at Wentworth on the border of Victoria. It has a drainage basin of about 200,000 square miles, mainly arid, except for a strip on either bank. (2) Darling district is a pastoral district about 50,000 square miles in extent, in the southwest of New South Wales, and watered by the Darling and the Murray. (3) The Darling Downs are a rich table-land west of Brisbane in Queensland, forming excellent pasture and arable land. It is well watered, and measures about 6,000 square miles. (4) The Darling Range, granite mountains in western Australia, running in a northerly direction parallel with the coast from Point D'Entrecasteaux for nearly 250 miles. Its highest peaks do not exceed 1,500 feet.

DARLINGTON, James Henry, American Protestant Episcopal bishop: b. Brooklyn, N. Y., 9 June 1856. He was graduated at New York University in 1877 and three years later at the Princeton Theological Seminary. In 1882 he became assistant, and from 1883 to 1905 was rector of Christ Church, Brooklyn. On 26 April 1905 he was consecrated first bishop of Harrisburg. In 1902–03 he was lecturer at New York University and from 1910 to 1915 served as chaplain of the Masonic Grand Lodge of Pennsylvania. He edited 'The Hymnal of the Church'; 'In Memoriam'; 'Little Rhymes for Little People,' and is the author of 'Pastor and People' (1902) and sermons on various subjects.

DARLINGTON, England, a municipal and parliamentary borough in Durham County nine miles west-southwest of Stockton-on-Tees. It is well built, chiefly of brick, and nearly in the form of a square, and has among its public buildings an ancient Gothic church with a lofty spire, founded in 1160, and restored in 1865. The woolen manufacture is carried on to a considerable extent; there are important iron and steel manufactures; also the locomotive works of the North Eastern Railway are located here. The town is on the old Stockton and Darlington Railroad, which was the first line in England on which locomotive steam-engines were used. The borough returns one member to the House of Commons. Pop. 55,631.

DARLINGTON, S. C., town, county-seat of Darlington County, on the Atlantic Coast Line Railroad, about 70 miles northeast of Columbia. It is in an agricultural region, and is a trade centre for tobacco, cotton, corn, and other products. The manufactures are chiefly cotton goods, tobacco, cottonseed oil, and fertilizers. Pop. 3,789.

DARLINGTONIA, a genus of pitcher-plants, belonging to the family *Sarraceniaceæ D. californica* grows in the northern part of California, chiefly in the district around Mount Shasta. It is found in boggy places on the slopes of mountains. It entraps insects, which are attracted to the curious pitcher or hood at the extremity of the tubular leaves; and, once inside, the insects are prevented by the fine hairs which point downward from returning. Sometimes the pitchers at their base are filled to the depth of four or five inches with insect remains. The larva of a small moth *Xanthoptera semicrocea* preys on the plant, and that of a dipterous insect, *Sarcophaga sarraceniæ*, feeds on the dead insects which it encloses. See CARNIVOROUS PLANTS.

DARMESTETER, Agnes Mary Frances Robinson, English poet: b. Leamington, England, 27 Feb. 1857. She has attained great proficiency in Greek studies, her verse showing the influence of Hellenic literature. In 1888 she married James Darmesteter (q.v.), the Orientalist, who died in 1894, and in 1901 she married Émile Duclaux, director of the Pasteur Institute in Paris. Her writings include 'A Handful of Honeysuckle' (1878); 'The Crowned Hippolytus, from Euripides' (1881); 'Arden,' a novel (1883); 'Emily Bronte' (1883); 'The New Arcadia and Other Poems' (1884); 'An Italian Garden' (1886); 'The End of the Middle Ages: Essays and Questions in History' (1888); 'Songs, Ballads and a Garden Play' (1888); 'Lyrics' (1891); 'Retrospect' (1893); 'Life of Renan' (1897); 'A Mediæval Garland' (1897); 'Collected Poems' (1901) 'The Return to Nature' (1904); 'The French Ideal' (1911); 'Twentieth Century French Writers' (1914); and in French, 'Marguerites du Temps Passé' (1892); 'Froissart' (1897); 'Grands Écrivains d'Outtremanche' (1901); 'La Vie de Émile Duclaix' (1907); 'Madame de Sévigné (1814).

DARMESTETER, därm'stĕ-tār', **James,** French Orientalist: b. Château-Salins, 28 March 1849; d. Maisons-Lafitte, near Paris, 19 Oct. 1894. He was of Jewish parentage; received his education at The Lycée Bonaparte, Paris; and became professor of Zend at the École des Hautes Études. In 1885 he became professor of Iranian languages and literature at the Collège de France. In 1886 he went to India where he spent several years at philological research, and became fellow of Bombay University. He succeeded Reñan as secretary of the Société Asiatique de Paris and edited a prominent journal, *La Revue de Paris*. Besides works of strict scholarship on the Oriental literatures, as 'Ormazd and Ahriman' (1877); 'Iranian Studies' (1883); 'Origins of Persian Poetry,' he wrote many essays on miscellaneous subjects. There is an English translation of some of his 'Selected Essays.' He translated with Mills the 'Zend-Avesta' for the 'Sacred Books of the East' series, published by the University of Oxford and edited by Max Müller.

DARMSTADT, därm'stät, Germany, capital of the Grand Duchy of Hesse, near the

Darm River, 15 miles south of Frankfort. It consists of an old and a new town. The former, which is the business part of the town, is very poorly built; the houses are old, and the streets narrow and gloomy. The new town is laid out with great regularity, and has handsome squares and houses. Among the remarkable buildings are the old palace, with a library of 564,000 volumes and 4,000 MSS.; a picture gallery with some good examples of the early German and Dutch masters. The chef-d'oeuvre is the ‹Madonna of the Burgomaster Meyer› by Holbein the Younger. It has a museum of natural history, the Roman Catholic church, patterned after the Pantheon, the Stadtkirche, and the Rathhaus, or town-hall, built in 1580. Other notable features include the new palace, the palace of Prince Henry, the new town-hall, theatre, and the Herrngarten, a fine public garden and park. Darmstadt has some iron foundries, breweries, and other manufactures, and its industries are increasing, but it depends more upon the residence of the Court than upon either trade or manufactures. The chief articles of manufacture are machinery, carpets, hats, tobacco, chemicals, scientific instruments, playing cards, and beer. It owns its own electric and gas plants, and its schools, and charitable institutions are numerous for its population. Justus von Liebig, the scientist, was born here in 1803. Darmstadt appears as Darmundstadt in the 11th century. It acquired municipal rights in 1330 and became in 1567 the capital of Hesse-Darmstadt. It was burned by the French in 1688 and 1693, but attained great prosperity toward the end of the 18th century. Consult Zernin and Wörner ‹Darmstadt und seine Umgebung› (Zurich 1890). Pop. 87,089.

DARMSTÄDTER BANK, The. The Darmstädter Bank was established at Darmstadt in 1853 as the Bank für Handel und Industrie, but it is from 1856 that its important activities begin. Its initial authorized capital was 25,000,000 florins (say 42,750,000 marks), of which 10,000,000 florins were issued at first. While devoted to the general banking business, its policy has always aimed at maintaining the liquidity of its resources and the avoidance as much as possible of long-term engagements. The deposit business was not systematically encouraged, as the utilization of its own means was held to give greater stability to the institution and to its financial activities. In many respects its policy coincided with that of the A. Schaafhausen'scher Bankverein. Its charter was modeled after that of the Crédit Mobilier, providing «for the issue of such bank obligations as, secured indirectly by the newly created industrial enterprises, were to combine the scattered small capitalist forces in the launching of large enterprises.» Up to a very recent period the Darmstädter Bank has been exclusively an institution for the promotion of industry, and relatively unimportant as a bank for the emission of state, communal, and railway securities. In the promotion of industrial enterprises, largely through stock issues, the bank from the outset retained large blocks of the shares issued — a source of incidental financial losses more than counterbalanced by the control given to the institution through board membership, in addition to actual dividends. In 1900 the bank decided to foster the deposit business, there being (1908) 31 deposit offices, of which 16 were in Berlin. From its beginning certain operations were carried on abroad, particularly in Italy, Belgium, and Austria-Hungary, joining with the Rothschilds and the Kreditanstalt in State and railway finance operations in the last named. Commandites, to promote foreign business relations, were early established, but without uniform success, as being in advance of their time. As early as 1854 a commandite was formed at New York with the firm of G. vom Baur & Co., and in 1857 and 1867 in Paris and Vienna respectively. In 1908 the whole number of commandites was 4; branches, 7; establishments, 5; and agencies 5; all these in Germany. Through subsidiary banks or connections, the Darmstädter Bank has direct representation in The Netherlands, China, Japan, Italy, Belgium, London and Bulgaria; and through communities of interest, stock ownership, board representation, etc., either active or silent, this institution has connections with every portion of the German Empire and every foreign land. Board representation is maintained in 92 important industrial corporations, many interested in international trade. In 1909 the capital of the Darmstädter Bank was 154,000,000 marks; surplus, 30,250,000 marks. The capital control of the Darmstädter Bank group amounted (in 1908) to 297,437,490 marks, of which 255,750,000 marks constitute the capital and 41,687,490 marks the surplus. Consult ‹Die deutsche Grossbanken und ihre Konzentration,› by Riesser, Dr. J. (1909); ‹Germany's Economic Forces› (1913); ‹Report on Co-operation in American Export Trade› (Washington 1916).

DARNEL, the popular name for *Lolium temulentum*, which some suppose to be the *Infelix lolium* of Virgil and the *Zizania* (tares) of Scripture. It was believed by the ancients to be poisonous and narcotic. It is common in waste places and fields in America from New Brunswick to Georgia and northwestward to Michigan. It is remarkably abundant on the Pacific Coast and is generally a troublesome weed. It has beeen naturalized from Europe. It has been shown that its poisonous properties are due to a peculiar fungus that almost always infests the seed.

DARNLEY, Henry Stuart, Lord, husband of the Scottish queen, Mary Stuart: b. England 1546; d. Edinburgh, 10 Feb. 1567. His father, the Earl of Lennox, was descended from a branch of the house of Stuart; his mother, Margaret Douglas, was the daughter of Margaret of England, sister of Henry VIII. Darnley, though devoid of real merit, had, by his personal attractions, won Mary's heart, but it was an unfortunate match; and ere long gave rise first to coolness, then to open quarrel, and finally to deadly hate. Darnley thought, or affected to think, that her regard for David Rizzio was of a kind which no husband ought to tolerate. He leagued with a body of conspirators, who, on 9 March 1566, dragged Rizzio from the queen's presence, and murdered him under circumstances of horrid barbarity. About the end of that year Darnley was seized with smallpox. In January Mary had him conveyed to an isolated house called Kirk of Field, which stood at some distance from Holyrood. This dwelling, which belonged to a retainer of Bothwell, the rapidly rising favorite, was blown into the air with gunpowder. The dead bodies of the king and his page were found in a field at a distance of 80 yards from the house, quite free from any mark which such an explosion would cause. Previous to this tragedy a son had been born of the marriage, who afterward united the Scotch and English crowns under the name and title of James I of England and VI of Scotland.

DARROW, Clarence S., American lawyer: b. Kinsman, Ohio, 18 April 1857. He was educated in the public schools of Ohio and was admitted to the bar in 1875. For a time he was attorney for the Northwestern Railway. He has been identified with many prominent cases of recent years, notably in suits against monopolies, including protracted litigation against combine in Chicago. He was chief counsel for the anthracite miners in the anthracite coal strike arbitration at Scranton and Philadelphia in 1902–03, was counsel in the Debs strike case and in a large number of labor injunction and labor conspiracy cases on the side of labor. In 1902 he was elected member of the Illinois legislature. He has been active in politics as an Independent Democrat. He was counsel for the McNamara brothers in the Los Angeles *Times* case in 1911 and was indicted for alleged bribery of a juror and a talesman in connection with that case, but was acquitted after a trial which extended over three months. He defended Moyer, Haywood and Pettibone when they were tried for the murder of Governor Steunenburg of Idaho. Formerly he was a member of the law firm of Darrow, Masters and Wilson, Chicago, and is at present member of the firm of Darrow and Sissman.

DART, a javelin, a short missile weapon thrown by the hand, or impelled by the breath, through a tube. Dart-heads are usually made of iron, but among savage nations flints, sea-shells, fish-bones, and other hard substances have been employed; and among some of the aboriginal inhabitants of the United States and Africa, the dart was merely a sharp-pointed stick, the end of which was carbonized by fire. The weapon is always very simple in its construction, and is usually from three to five feet long.

DART MOTH, a name applied to the genus *Agrotis,* a night-flying moth of destructive habits, the caterpillar of which is widely known as the cut-worm (q.v.). A European species is the winter dart moth which destroys wheat. The American group includes several species, most of which appear about midsummer.

DARTER, a name given to water birds of a small family (*Anhingidæ*), found in the southern United States, in Africa, Asia and Australia. The American species (*Plotus anhinga*), also called the snake-bird and water-turkey, is especially common in Florida, and extends northward to North Carolina and Illinois. In appearance and habits the darter resembles the cormorant, especially in the structure of the feet, wings and tail; the bill and neck are like those of the heron, the neck, owing to a peculiar anatomical mechanism, being remarkably flexible. The general color of the body is dark glossy green with silvery gray markings; wings and tail bluish-black. The tail is rather long and consists of 12 narrowly wedge-shaped quills. Their haunts are in low swampy localities, by the side of murky streams. They generally perch on trees whose branches dip into the water. They are the best fresh-water divers known, and drop into the water with such surprising skill that the large body makes scarcely any noise, and but little ripple on entering the water. When swimming, its body is submerged, and the only part visible is the long neck, writhing about like an aquatic serpent, from which peculiarity its name of snake-bird. Its food consists of small fish, shrimps, young reptiles, leeches, etc. The quantity of fish it can consume is enormous; but, like other birds feeding on fish and flesh, it can remain several days without food with impunity. It captures fish, not by diving upon them from above, but by pursuing them under water and spearing them with its closed beak. A bulky nest of sticks, roots, etc., is placed in a tree and receives three or four white, chalky eggs.

DARTERS, small fresh-water fishes forming a sub-family of the *Percidæ* (q.v.), from the typical members of which they are distinguished by having the pseudobranchiæ (opercular gills) imperfect or absent, the margin of the gill-cover smooth, the skull less perfectly ossified, etc. They have been described as perches reduced in size and compacted. The *Etheostomatinæ* are peculiar to North America, where 15 genera and about 80 species occur, mostly in rocky rills and clear mountain brooks too small to be occupied by other fishes. They are among the smallest of fishes, some of the species being less than two inches, and the largest — the so-called log-perch (*Percina caprodes*) of the Great Lake region and Mississippi Valley — only six to eight inches long. The typical and largest genus is *Etheostoma.* The darters spend most of their time resting on their fins on the bottom, hiding beneath stones or burying themselves in the sand, leaving only the eyes uncovered. Owing to the protective resemblance of their often brilliant markings to the bottom, they are difficult to distinguish. When disturbed, most of the species dart for a short distance with the greatest rapidity, and again settle on the bottom in a quiescent state. These little fishes are among the most interesting inhabitants of our fresh waters, and a valuable account of their habits will be found in a paper by Jordan and Copeland in the *American Naturalist* for 1876.

DARTFORD, England, market-town of Kent, in the narrow valley of the Darent River, two miles above its entrance into the Thames, and 17 miles east-southeast of London. Edward III here founded an Augustinian nunnery (1355); Saint Edmund's chantry was a great place of pilgrimage; and at Dartford Wat Tyler began his rebellion (1381). Spielman built here the first paper-mill in England (1590). There is considerable manufacturing, chief of which are locomotives and machinery, cotton goods, gunpowder, paper and corn meal, oil and chemicals. Pop. 23,609.

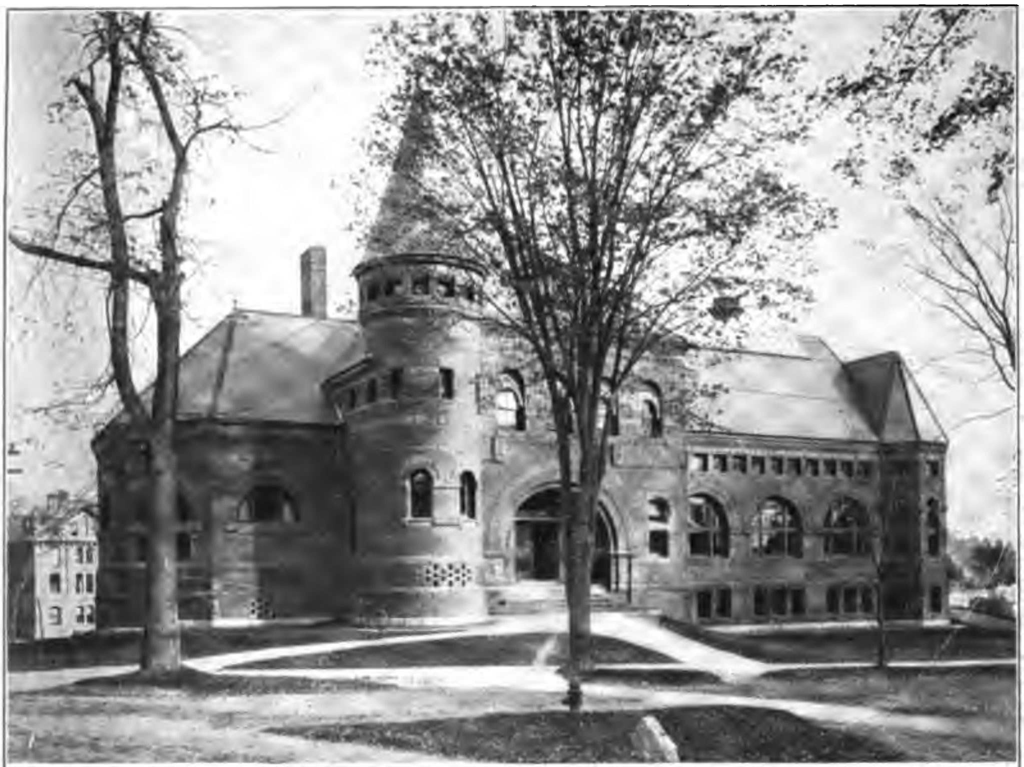
DARTMOOR, an extensive, rugged, mountainous tract in England, in the western part of Devonshire, often called the «Forest of Dartmoor,» but at present having no appearance of a forest, except what is afforded by some dwarf oaks, intermixed with ash and willow, reaching from Brent south to Okehampton north, 22 miles, with a breadth of about 20 miles, and occupying about 140,000 acres. In the centre of the moor there is an extensive swamp in which the rivers Dart, Teign, Taw, Yealm, Erme and a great number of smaller streams have their source. Cattle and sheep are fed on the coarse grass during the summer months. In the winter the storms from the Atlantic sweep over it and it would be difficult to imagine a more desolate-looking place. Several of the rugged granite hills (here called "tors") are of considerable height, Yes Tor rising 2,050 feet above the plain. The district is noted as being the site of a prison built in 1809 for the custody of the French prisoners of war. At one time it contained 10,000 inmates. It is now fitted up for the reception of convicts. Experiments made in cultivating the moor by convict labor have turned out successful. The quarries to the west of the prison also give employment to convict labor. The large kaolin-works and a meteorological observatory are at Lee Moor. Dartmoor offers considerable attraction to the tourist and naturalist. Druidical and other aboriginal remains may be traced, especially Gray Wethers, which is thought to have been a Druidical temple. The dolmens, cairns and other indications of an ancient town are found at Drewsteignton. Since 1337 Dartmoor has been part of the duchy of Cornwall.

DARTMOOR MASSACRE, The, 6 April 1815. During the War of 1812 the American naval prisoners of the British, with impressed American seamen discharged from British vessels, were collected at Dartmoor military prison. On 31 March 1815 they numbered 5,693, including about 1,000 negroes. They had heard of the Peace of Ghent, 24 Dec. 1814, and expected immediate release; but the British government refused to let them go on parole or take any steps till the treaty was ratified by the Senate, 17 Feb. 1815. It took several weeks for the American agent to secure ships for their transportation home and the men grew very impatient. On 4 April the dishonest food contractor attempted to work off some damaged hardtack on them in place of soft bread and was forced to yield by their insurrection, and the commandant, Capt. T. G. Shortland, suspected them of a design to break jail. This was the reverse of truth in general, as they would lose their chance of going on the cartels; but a few had made reckless threats of the sort and the commandant was very uneasy. About 6 P. M. of the 6th he discovered a hole from one of the five prisons to the barrack yard near the gun-racks. Others had been begun, apparently for pastime. Some prisoners were outside the guard railing noisily pelting each other with turf, and many more near the breach (and the gambling tables), though the signal for return to prisons had sounded; altogether he was convinced of a plot, and rang the alarm bell to collect the officers and have the men ready. This luckless precaution brought back a crowd just going to quarters; just then a prisoner broke a gate-chain with an iron bar and a number pressed through to the prison market square; and after attempts at persuasion, Shortland ordered a charge which drove part of the prisoners in. Those near the gate, however, hooted and taunted the soldiery, who fired a volley over their heads; the crowd yelled louder and threw stones, and the soldiers, probably without orders, fired a direct volley which killed and wounded a large number. Then, losing their heads, they followed the throng of prisoners struggling franctically to get within the prison doors, shooting them down as they went, some even going up to the doors and firing in; while others ran up to the walls and fired into the fleeing knots below. Finally the captain, a lieutenant and the hospital surgeon (the other officers being at dinner) succeeded in stopping the murder and caring for the wounded — about 60, 30 seriously, besides seven killed outright. The affair was examined by a joint commission, Charles King for the United States and F. S. Larpent for Great Britain, who agreed in exonerating Shortland, justifying the first firing, blaming the subsequent and pronouncing the culprits undiscoverable. The British government provided for the families of the killed, pensioned the disabled and promoted Shortland. Consult Charles Andrews, 'The Prisoners' Memoirs; or Dartmoor Prison'; Cobb, 'A Green Hand's First Cruise, Together with Five Months in Dartmoor.'

DARTMOUTH, Canada, a town on the Chebucto River, one mile east of Halifax Harbor, on the Intercolonial Railway. It was founded by British settlers in 1750, and was for a number of years the centre of a whale-fishing industry which was established by a colony of Nantucket Quakers after the American Revolution. It is connected by ferry with Halifax, and has iron foundries, shipbuilding and repairing, fish cannery, rolling mills, cordage manufactory and sugar refining. Pop. 5,058.

DARTMOUTH COLLEGE, a seat of learning in Hanover, N. H., which received its charter in 1769 and opened its doors the following year under the presidency of Eleazer Wheelock, D.D. It grew out of an earlier school established by Eleazer Wheelock in Lebanon, Conn., and was intended for the education of Indian children. The idea of this school had been suggested to him by his success in educating a young Mohegan Indian, Samson Occom, who became a remarkable preacher. Other pupils from several Indian tribes were afterward received and the school became an object of public attention and interest. In 1754 a farmer named Joshua Moor gave a house and two acres of land for the purposes of the institution, which was from this time known as Moor's Indian Charity School. Occom, accompanied by the Rev. Nathaniel Whitaker, visited England to collect funds; a sum of over $50,000 was subscribed and a board of trustees was there organized, of which Lord Dartmouth, one of the subscribers, was made president. The school was so much resorted to by the native tribes that Dr. Wheelock determined to transfer to some place near to them. Many offers of situations were extended to him, but he selected the town of Hanover, on the Connecticut River, in the western part of the State of New Hampshire, and grants of about 44,000 acres of land were made to him. The institution was chartered by Governor Wentworth under the name of a college, with all the privileges and immunities of any university within the British realm, and was called Dartmouth College in

DARTMOUTH COLLEGE



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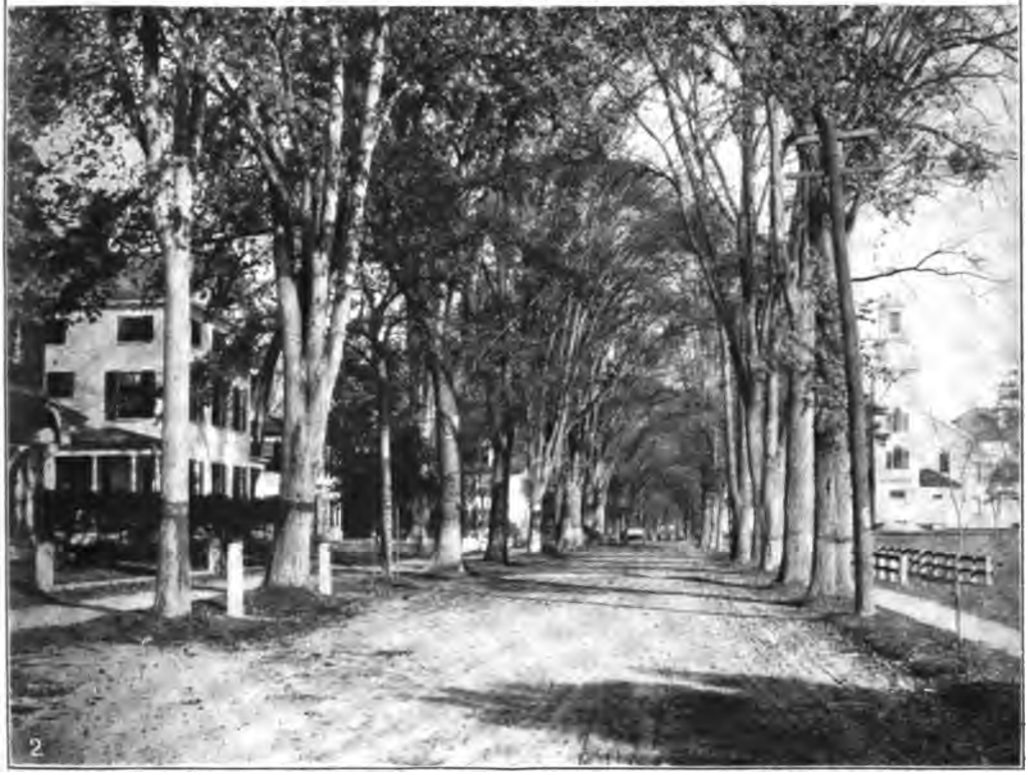

2 Faculty Avenue

honor of the Earl of Dartmouth. Moor's school soon afterward obtained an independent charter and remained as an academical or preparatory department until 1849. It maintained a legal existence until 1915, when by a decree of the court it was consolidated with the college. In 1770 Dr. Wheelock removed his family and school, consisting of 18 whites and 6 Indians, from Lebanon to the wilderness of Hanover, where the whole colony lived in log huts. In 1771 the first class of four students was graduated. President Wheelock retained his office till his death in 1779, and was succeeded by his son, John Wheelock, who, in 1782, was sent by the trustees to Europe to promote the interests of the college; and through introductions by General Washington, Dr. Franklin and John Adams he obtained considerable sums of money, philosophical instruments and other valuable donations. William, Prince of Orange, was one of the donors. Wheelock returned in 1784, and after a presidency of 36 years was removed from the office by the trustees, in 1815. This act, which had its origin in a local religious controversy, led to a conflict with the legislature of the State; that body claimed the right to amend a charter of which it was the guardian, and in 1816 passed acts creating a new corporation, in which the property was vested, and changing the title of the college to Dartmouth University. The old trustees began a suit for the recovery of the college property. (See Dartmouth College Case). Wheelock, who was succeeded as president of the college by Francis Brown, was raised to the presidency of the university, in February 1817, by the trustees of that institution, but died within two months. He was succeeded by William Allen, D.D., and in 1819 the «College Case» was decided in favor of the college, when the university disbanded.

Dartmouth College still remains an institution for men only. It comprises, besides the regular classical department: the medical school, founded in 1798; the «Chandler School of Science,» established in 1851, by the trustees, on the receipt of a bequest of $50,000 from Abiel Chandler, who left it to them in trust «for the establishment and support of a permanent department or school of instruction in the college, in the practical and useful arts of life.» The course in this school, leading to the degree of bachelor of science, covered four years and included courses in general science, political science, modern languages, mathematics and history, was incorporated into the college in 1893 and is now known as the Chandler scientific course. Another department is «The Thayer School of Civil Engineering,» founded in 1867 by Sylvanus Thayer, a graduate of Dartmouth. This is a graduate school, comprising a two years' course in civil engineering. The government of this school is vested in a board of five overseers, of whom one is the president of Dartmouth College. In 1900 the trustees created the «Amos Tuck School of Administration and Finance,» according to the terms of the Amos Tuck Endowment Fund, the gift of $300,000 by Mr. Edward Tuck, of the class of 1862, as a memorial to his father, of the class of 1835. This school is post-graduate in nature and is established in the interest of college men who desire to engage in affairs rather than enter the professions. The report of the college for 1915 gives the following statistics: Officers of administration and instruction, 130; number of students, 1,468; volumes in library, 125,000, and 20,000 pamphlets; the value of the college plant, $2,000,000, with $750,000 additional invested in dormitories; the value of the endowments, $4,000,000.

DARTMOUTH COLLEGE CASE, The. The Dartmouth College Case is the name by which is commonly known the action entitled Trustees of Dartmouth College *v.* Woodward, which is repeated in volume four of Wheaton's ‹United States Supreme Court Reports.› Perhaps no decision ever rendered in any tribunal has attracted more attention or exerted a greater influence over the legislative and judicial history of our land than has the decision in this case, which arose as follows:

In the year 1769 the Rev. Eleazar Wheelock, aided financially and politically by friends in England and America, conspicuous among whom was the Earl of Dartmouth, and with the assistance of the Province of New Hampshire, given in the form of extensive land grants, founded Dartmouth College under a charter from King George III of England. This charter vested the control of the institution in a board of trustees, who were designated by Mr. Wheelock to manage the same, and under the management of those trustees so incorporated and their successors the college grew and prospered until the year 1816, when the State legislature passed an act amending its charter by which they curtailed the power of its trustees, changed its name to Dartmouth University and made it a State institution subject to State control. For protection against this infringement of their powers, the trustees had recourse to the courts in the now famous case above named.

In the State tribunals the decision went against the college trustees and an appeal was taken to the Supreme Court of the United States, the appeal being based upon the theory that the charter granting the control of the college to the trustees was a contract, that under Section X of Article 1 of the Federal Constitution no State can pass an act impairing the obligation of any contract, and that the said act of the New Hampshire legislature violated the contract of the charter of Dartmouth College.

It should be remembered that in 1819 when the case came up for final hearing, the popular views of the scope and effect of the National Constitution were far from harmonious. All then regarded that instrument as the greatest existing governmental compact, but the Republican party then in power demanded that it be so strictly construed as to preserve unimpaired the rights and powers of the individual States. On the other hand, there then presided over the Federal Supreme Bench, in the person of John Marshall, one of the «midnight appointees» of John Adams, the last President of that Federalist party which demanded so liberal a construction of the instrument as to give the country a strong national government. Of the section of the Constitution invoked, we may safely say with Ordronaux that «Drafted at a time when commerce was in its infancy; when public credit was depreciated to the lowest ebb; and confidence in monetary transactions almost destroyed, it was manifestly introduced as a barrier against the tide of repudiation which threatened to overwhelm both public and private credit." The framers of the Constitution never intended that clause to be given the interpretation urged in this case. But the case was up before a court presided over by the jurist who has been truthfully said to have "found the Constitution a skeleton and clothed it with flesh and blood." Therefore, when it was clearly shown, as it was in the celebrated argument of Daniel Webster for the college trustees, that this case came fairly within the provisions of that section, in principle, the court, guided by John Marshall, held that the act of the New Hampshire legislature was void because it impaired the obligation of a contract. Justice Duvall alone dissented.

This decision has perhaps been more severely criticized and has perhaps given rise to more strenuous efforts to escape its consequences than has any other decision of the tribunal which rendered it, and the reasons are obvious. While it gave assurance that capital invested in chartered business and charitable ventures would be forever protected from legislative interference, it also invited political corruption by saying in effect to promoters of corporations that the courts would protect them in the possession of every concession or right which they beguiled from pliant legislative bodies. It made possible the mechanical and industrial achievements of the 19th century in this country, but it also made profitable the limitless corruption which has attended those achievements and which has frequently, by virtue of this decision, stripped the government of very important powers.

But the correctness of a judicial decision is not to be gauged by its influence for weal or woe. Rather should that be determined by its conformity to the Constitution, the statutes and the judicial precedents upon which it rests and the approval given it by later decisions. Judged by this test we must hold that Marshall and his colleagues decided well in the Dartmouth College Case. The Supreme Court of the United States had early laid down the rule that there are certain vital principles of republican government which will overrule a flagrant and apparent abuse of legislative power. It had in the year 1810 declared a law granting land to private companies to be in effect a contract which could not be so repealed as to impair the obligation of that contract. If the passage of the law were procured by fraud the court there doubted its power to declare it void for those reasons, but if that power existed it could be exercised only under those rules of law and equity which govern private transactions. Two years later there came before the same court a case involving a somewhat similar question. The State of New Jersey had traded land with an Indian tribe and had, by legislative enactment, provided that the Indians should forever hold the lands received by them free from taxation. With the consent of the State they sold their lands and, the question being properly presented, the court held that the law granting the exemption was a contract, that the exemption ran with the land and that the purchasers from the Indians enjoyed the same exemption.

By the decision in the Dartmouth College Case the rules laid down in the foregoing cases were followed and their application extended to contracts in charters of incorporation, but their force when so applied had already been limited by another line of decisions. In 1804 Chief Justice Marshall, speaking for the court, had said that the charter gives to a corporation all of the powers it possesses and no powers not granted can be exercised. A little later he had decided that there is a difference between a grant of corporate existence and a grant of peculiar remedies. The first is general. The second can only be exercised in those courts which the power bestowing the privilege can regulate. Moreover, as the bank charter involved in that case contained a clause making it a felony to counterfeit its notes, the court believed it to be a public act and subject to repeal by succeeding legislatures. And in the year 1819 the same court had decided that the right to use a peculiar form of attachment granted in its charter to a bank could be taken away at any time because "The forms of administering justice and the duties and powers of the courts as incident to the exercise of a branch of the sovereign power must ever be subject to the legislative will and the power over them is inalienable so as to bind subsequent legislatures."

It is thus made fully apparent that the Dartmouth College Case decided only that if a legislative grant, whether made in the form of a charter of incorporation or in any other form, conveyed to private citizens that which the legislature had power to contract away, the grant so made was a contract and no succeeding legislature could rescind the same without following the same rules which govern the rescission of private contracts. But if there is any doubt that such was the understanding of the chief justice who wrote the opinion of the court in that case, the same will be removed by a consideration of certain later decisions in which he participated. In the year 1821 the court over which he presided decided that Congress had power to incorporate a lottery to do business beyond the limits of the District of Columbia, yet, where no mention was made thereof in the charter, it would not be presumed that Congress had done so and had thereby deprived the States of their power to regulate lotteries by preventing the sale of tickets within their boundaries. In the same year the same court decided that a town government cannot contract away its legislative power. And in the case of Providence Bank *v.* Billings, the court presided over by Marshall decided that while a State might, through its legislature, grant immunity from taxation, it could not be presumed to have done so, and that, in the absence of any agreement to the contrary, it might tax to death a franchise which it had itself granted.

But the effect of the Dartmouth College decision was not fully understood at the time of its rendition and the States eagerly availed themselves of a suggestion found in the decision itself to the effect that if they wished the right to amend, alter or repeal charters granted by them they must expressly reserve that power. Such a reservation, whether expressed in the charter itself, the Constitution or the general laws of the State, has been held to have the effect of "placing the State legislature back on the same platform of power and control over the charter containing it, as it would have occupied had the constitutional restriction never existed." Yet the later decisions hold that this reserve power must be reasonably exercised.

The alterations must be made in good faith and consistent with the objects and scope of the act of incorporation. Sheer oppression and fraud cannot be inflicted under the guise of amendment or alteration. This power cannot be so employed as to defeat or substantially impair the object of the grant or any right which has become vested under it. Where this power has been reserved, a State may tax property which it has forever exempted from taxation, but the taxes must not be greater than those imposed upon other property. It can regulate the charges of common carriers, but no such legislation must amount to the taking of private property for public purposes without due process of law. We thus see that not only was the Dartmouth College decision as moderate as any of the later cases which have been said to have practically overruled it, but that even where reservations in charters have obviated the effect of that decision the later courts have reached a similar conclusion by a different chain of logic.

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DARTON, Nelson Horatio, American geologist: b. Brooklyn, N. Y., 17 Dec. 1865. He received a common school education and became an analytical chemist and geologist. In 1886 he became geologist to the United States Geological Survey, from which in 1910 he was transferred to the post of geologist to the Federal Bureau of Mines of the Geological Survey. In 1912 he again became geologist to the United States Geological Survey. His chemical researches were on sugar refining, tannic acid and water analysis; the latter led to the elimination of 300 polluted pump wells in Brooklyn. He is a specialist in geology of underground waters, and much of his later work consists of government reports on artesian conditions and structural materials. He edited the Survey's first bibliography of North American geology from 1732 to 1891 in ‹Survey Bulletin 127› (1906), and has published many articles in magazines and scientific journals.

D'ARUSMONT, dä-rüs-môṅ, **Madame Frances** (maiden name Fanny Wright), American philanthropist and author: b. Dundee, Scotland, 6 Sept. 1795; d. Cincinnati, Ohio. She married M. d'Arusmont in 1838, but the marriage was not a congenial one and her later years were spent in the United States. She lectured extensively on social, religious and political questions. Among her works are ‹Views on Society and Manners in America›; ‹Altorf,› a tragedy (1819); ‹Lectures on Free Inquiry› (1836).

DARWAR, där'wär, or **DHARWAR,** India, (1) town and fortress in the presidency of Bombay, 285 miles southeast of Bombay city, capital of a district of the same name. The town exports cotton and rice. It is connected by railroad with Goa, the Portuguese colony, and with other places. Pop. (1911) 30,289. (2) The district of Darwar has an area of 4,602 square miles. The soil and climate are well adapted to the cultivation of cotton. The climate is about the healthiest in the Bombay presidency. Pop. about 1,100,000.

DARWEN (till 1889 Over Darwen), England, a municipal borough in the northeast of Lancashire, four miles south of Blackburn. The staple manufacture is cotton. The other manufactures are paper, iron castings, machinery, earthenware, etc. Coal and stone are abundant in the neighborhood. Water, gas, electric lighting and tramways are municipally owned. Pop. 40,322.

DARWIN, Charles Robert, English naturalist: b. Shrewsbury, 12 Feb. 1809; d. Down, Kent, 19 April 1882. His father, Robert Waring Darwin, was a distinguished physician of that town, the son of a still more distinguished father, Erasmus Darwin (q.v.). He was educated at Shrewsbury School, and at the universities of Edinburgh and Cambridge. He early devoted himself to the study of natural history and in 1831 was appointed naturalist to H.M.S. *Beagle,* then about to sail on an extended surveying expedition. He served without salary and paid a portion of his expenses on condition of having at his own disposal such collections of specimens as he might make during the voyage. The vessel sailed in December 1831 and did not return till October 1836, after having circumnavigated the globe. Darwin came home with rich stores of knowledge, part of which he soon gave to the public in such works as his ‹Journal of Researches into the Natural History,› etc. (1839), of the countries visited; the ‹Zoölogy of the voyage of H.M.S. *Beagle*› (1840–42); ‹Structure and Distribution of Coral Reefs› (1842); ‹Volcanic Islands› (1844); ‹Geological Observations› (1844–46). Although known among naturalists as a man of distinguished ability, to the general public his name was not familiar, when all at once it attained a celebrity second to none by the publication in 1859 of ‹The Origin of Species by Means of Natural Selection.› This work, scouted and derided though it was at first in certain quarters, may be said to have worked nothing less than a revolution in biological science. In it for the first time was given a full exposition of the theory of evolution as applied to plants and animals, the origin of species being explained on the hypothesis of natural selection. The central idea of the work is that all forms of organic life are derived from a small number of primitive types, and that all the vast variety of vegetable and animal organisms now existing, or having formerly existed, have owed their origin to the slow and gradual operation of the modifying influence of local or special causes transmitted hereditarily; such forms as best suit any particular time and locality being selected and adapted by the action of natural laws for that time and locality. The theory of evolution was warmly taken up by some of the ablest men of science, and now there are few who have not in whole or in part given their adhesion to the principle. The rest of his works are largely based on the material he had accumulated for the elaboration of the great theory. (See Darwinian Theory; Origin of Species, The). The principal are a treatise on the ‘Fertilization of Orchids’ (1862); ‘Movements and Habits of Climbing Plants’ (1864); ‘The Variations of Animals and Plants under Domestication’ (1868); ‘Descent of Man and Selections in Relation to Sex’ (1871); ‘The Expression of the Emotions in Man and Animals’ (1872); ‘Insectivorous Plants’ (1875); ‘Cross and Self-Fertilization’ (1876); ‘Different Forms of Flowers’ (1877); ‘The Power of Movement in Plants’ (1880); ‘The Formation of Vegetable Mould’ (1881); the last dealing exhaustively with the common earth-worm. Darwin was buried in Westminster Abbey. Consult ‘Life and Letters of Charles Darwin’ (1887) by his son, Francis Darwin; ‘More Letters of Charles Darwin (1905); and volumes published on the occasion of his centenary (1909), ‘Foundations of the Origin of Species’; ‘Fifty Years of Darwinism’ (by American authors); and ‘Darwin and Modern Science’ (by foreign authors).

DARWIN, Erasmus, English physician and poet: b. near Newark, Nottinghamshire, 12 Dec. 1731; d. near Derby, 18 April 1802. Settling at Litchfield, he acquired a great reputation and an extensive practice. His son, Robert, was the father of the famous Charles Darwin. Erasmus Darwin's name is chiefly remembered for his poem of ‘The Botanic Garden,’ which is comprised in two parts. The first treats of the ‘Economy of Vegetation’ (1792), the second of the ‘Loves of the Plants’ (first published in 1789). It was received with much favor; but a very ingenious parody, entitled ‘The Loves of the Triangles,’ published in the *Anti-Jacobin* (and written either by Canning or Frère), greatly damaged its popularity. In 1794 Dr. Darwin published the first volume of ‘Zoönomia, or the Laws of Organic Life’; the second volume, completing the work, appeared two years afterward. In 1799 he published ‘Phytologia, or the Philosophy of Agriculture and Gardening.’

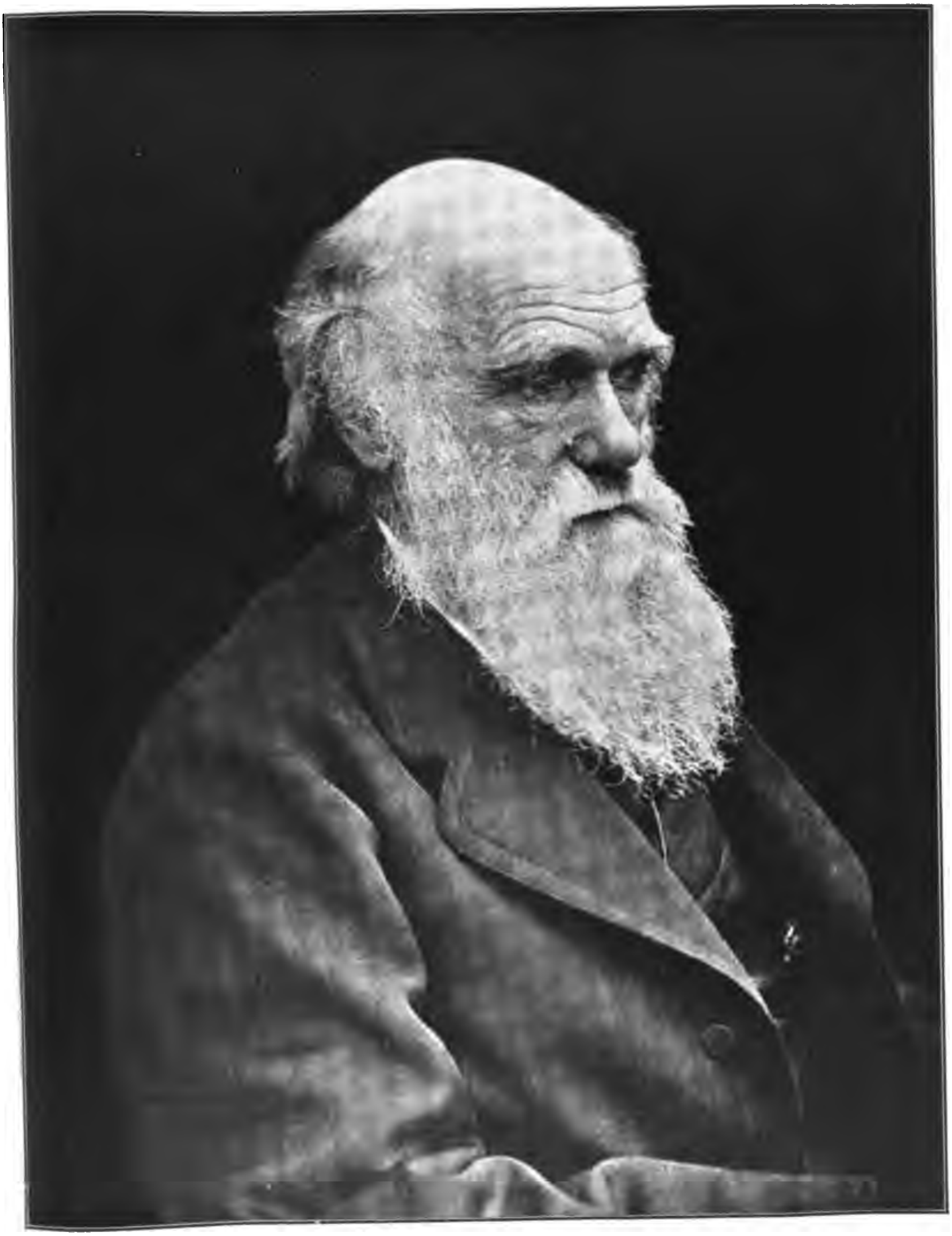
DARWIN, Sir Francis, English botanist: b. Down, Kent, 16 Aug. 1848. He is the son of Charles Robert Darwin (q.v.); was educated at Trinity College, Cambridge, and studied medicine at Saint George's Hospital in London. He did not practise medicine but assisted his father in his work at Down and was later made reader in botany at Trinity College. His works include ‘Life and Letters of Charles Darwin’ (1887); ‘Charles Darwin’ (1892); ‘Practical Physiology of Plants’ (with E. H. Acton, 1894); ‘Elements of Botany’ (1895); ‘More Letters of Charles Darwin’ (with Seward, 1903); ‘Foundations of the Origin of Species’ (1909). He was knighted in 1913.

DARWIN, Sir George Howard, English scientist: b. Down, Kent, 9 July 1845; d. 7 Dec. 1912. He was the eldest son of Charles Robert Darwin (q.v.); was educated at Cambridge, studied law and was admitted to the bar but did not practise. He was a fellow of Trinity College, Cambridge, 1868–78; was a member of the expedition to Sicily to observe the eclipse in 1870–71; and was appointed Plumian professor of astronomy and experimental philosophy at Cambridge in 1883. Among his writings are ‘Small Deflections of the Plumb Line due to the Movement of the Earth’; ‘Periodic Orbits’ (1896); ‘Tides and Kindred Phenomena in the Solar System’ (1898); ‘Scientific Papers’ (1907), etc. He was created K. C. B. in 1905.

DARWINIAN THEORY, the explanation of the working of natural selection in effecting specific changes in plants and animals. “Darwinism” must not be confused with “Evolution.” The term Darwinism is applied to one particular interpretation of the mechanism of the universe, and is summarized in Darwin's great work, ‘The Origin of Species by Means of Natural Selection.’ Whatever may be the future development of our evolutionary ideas, the epoch-making importance of the Darwinian theory will be unaltered.

Outline of Origin of Species.— To gain an insight into the means of modification, Darwin begins with a study of the variation of plants and animals under domestication. Those who admit the unity of domestic races should be cautious in denying the unity of the wild ones. Domestic races all exhibit adaptations to man's use or fancy, rather than to their own good. The key to this is man's power of selection. Nature gives successive variations, man accumulates these, so making for himself useful breeds, and often (for example, in sheep, cattle, roses, dahlias) profoundly modifies their character even in a single human lifetime; so that in all the characteristics to which he pays attention they may differ more than the distinct species of the same genera. Unconscious selection, which results from everyone trying to possess and breed the best animals, is even more important than conscious selection. Two flocks of Leicester sheep kept equally pure appear quite different varieties after 50 years. Such slowly accumulated change explains why we know so little of the origin of domestic races; and its absence in regions inhabited by uncivilized man explains why these yield no plants worth immediate culture. Human selection is facilitated (1) by the keeping of large numbers, since variations will be more frequent; and (2) by preventing free intercrossing. Some species vary more than others.

Variation under Nature.— No two blades of grass are alike, and far more marked differences often occur, several strains or varieties sometimes existing in the same species. Between these strains, and even between forms which systematic botanists and zoölogists rank as true species, perfectly intermediate forms may occur. No agreement about the definition of species (the amount of difference necessary to give any two forms specific rank) has ever been reached. It is an interesting fact, however, that closely allied species often differ in their chromosome number. Individual differences are of the highest importance as the first steps toward the slightest varieties worth recording; these in turn toward more distinct and permanent varieties; these varieties again toward sub-species, and in the next stage to species, though extinction may often arrest the process. The species which present most varieties are those which have the greatest geographical range or the widest diffusion in their own territory, or which possess the greatest number of individuals.



CHARLES DARWIN

Struggle for Existence.— All organic beings tend to increase with extreme rapidity, so that if they were not kept down the earth would soon be covered by the progeny of a single pair. Since organisms are reproducing themselves so rapidly, and not all their offspring can escape their enemies, get food and live, much less leave progeny in turn, there must in every case be a struggle for existence, either of one individual with another of the same species, with the individuals of distinct species, or with the physical conditions of life; often with all these at once, and that more or less intensely throughout the whole duration of life. The checks which prevent increase are more obscure and vary in each case. In all cases the amount of food gives the limit. The youngest organisms generally suffer most. The stock of game on an estate depends chiefly on the destruction of vermin. Climate is important and periodic seasons of extreme cold and drought seem the most effective of all checks. Epidemics too may occur, especially where numbers have inordinately increased. The struggle for life is most severe among individuals and varieties of the same species and among the species of the same genus, since these tend to fill the same place in the economy of nature. The structure of every being is related to that of the others with which it competes, or from which it seeks to escape, or on which it preys.

Natural Selection.— The natural process which results in the preservation of favorable variations and the elimination of injurious ones, is termed by Darwin «Natural Selection,» or less figuratively by Spencer, the «Survival of the Fittest.» No country can be named where the native inhabitants are perfectly adapted to their conditions and competitors, for as some foreigners have taken firm possession in every country, we may safely conclude that the natives might have been modified with advantage to resist them. Human selection acts only for man's own good on mere external and visible characters, and irregularly throughout a short period; natural selection acts for the good of the being itself, on the whole machinery of its whole life, and incessantly on the species, throughout almost infinite time. It leads to the improvement of each creature in relation to its organic and inorganic conditions of life, and consequently in most cases to what must be regarded as an advance in organization. The circumstances favorable to the production of new forms are great variability, large numbers of individuals, the complex effects of intercrossing, isolation in small areas, also extension over continental ones, especially if these vary in altitude or climate, and considerable lapse of time. Rare species are shown to be in process of extinction. The divergence of character in domestic breeds, largely due to the fact that «fanciers do not, and will not, admire a medium standard, but like extremes,» applies throughout nature from the circumstance that the more diversified the descendants from any one species become in structure, constitution and habits, by so much will they be better enabled to seize on many and widely diversified places in nature and so to increase in numbers. A carnivorous animal which has reached the maximum numbers its territory can support, cannot succeed in increasing unless its varying descendants seize places hitherto occupied by other animals. This must hold equally true of all species and is separately demonstrated for plants. The greatest amount of life can be supported by help of proportionally great diversification of structure; hence in small areas where competition is severe the inhabitants are extremely varied.

Sexual Selection.— Not merely do individuals struggle for existence, but the males struggle for the females and the most vigorous tend to leave most progeny. Several weapons offensive and defensive, like the cock's spurs, the stag's horns or the lion's mane, are used in this struggle, and the most useful variations are those which are transmitted. Just as man can in a short time give beauty to his domestic birds, so there is no reason to doubt that female birds, in thousands of generations by selecting, as they are observed to do, the most melodious or beautiful males, might produce a marked result, and many sexual differences are thus explained.

Laws of Variation.— The same laws appear to have acted in producing the lesser differences between varieties of the same species, and the greater differences between species of the same genus. Specific characters are more variable than generic and varietal than either. Rudimentary organs and secondary sexual characters are variable. Zebra-like stripes on horses or wood-pigeons' markings on fantails, tumblers, etc., may be explained as revisions toward their ancient progenitors.

Geological Succession of Organic Beings. — The most ancient forms differ widely from those now living, yet frequently present characters intermediate between groups now widely divergent and resemble the embryos of the more recent and more highly specialized animals belonging to the same classes. These and the important law of the succession of the same types within the same areas during the later geological periods, and most notably between the Tertiary Period and the present time, cease to be mysteries and become at once thoroughly intelligible on the principle of inheritance and on that alone. Darwin's belief that the distinctness of birds from all other vertebrates was to be accounted for by the extinction of a long line of progenitors connecting them with reptiles, was in 1859 a mere assumption, but in 1862 the long-tailed and palpably reptilian bird Archæopteryx was discovered, while in 1875 the researches of Marsh brought to light certain cretaceous birds, one with teeth set in a groove, the other with teeth in sockets and with biconcave vertebræ. Besides these reptilian birds, bird-like reptiles have similarly been forthcoming, and the hypothesis of Darwin is thus admirably verified.

Geographical Distribution.— Neither the similarity or the dissimilarity of the inhabitants of various regions, whether of land or sea, can be accounted for by identity or differences of climate or other physical conditions; but both are related in the most striking degree to the absence or presence of barriers to migration between those regions.

Morphological Arguments.—The physiological and distributional lines of argument furnished by morphology are mainly four, and are derived from (a) Classification, (b) Homologies, (c) Embryology, (d) Rudimentary Organs. The great fact of classification is that organic beings throughout all time are arranged in groups subordinated under other groups, individuals under varieties, and these again under species; species under genera; genera under sub-families, families and orders, and all under a few grand classes. The nature of all these relationships established by naturalists receives a simple and natural explanation on the view of the common descent of allied forms with modification through variation and natural selection, no other explanation ever having been attempted. The element of descent is already used in linking all the sexes, ages, forms and varieties of the same species, widely though these may differ from each other in structure.

The members of the same class, independently of their habits of life, resemble one another in their general plan of organization. Thus the hand of man, the digging-paw of the mole, the leg of the horse, the paddle of the porpoise and the wing of the bat, are all constructed on the same pattern, bone corresponding to bone. This conformity to type is «powerfully suggestive of true relationship, of inheritance from a common ancestor»; and admits of a simple explanation in terms of the evolutionary theory, thus strengthening that theory.

Serial Homology is that unity of type which is found on comparing the different parts and organs in the same individual. The complex and varied jaws and legs of a lobster, or the different leaves, sepals, petals, stamens and pistils of a flower are all found to be modifications of a simple leaf-organ respectively. Not only are such metamorphoses apparent on comparison, but they can be actually observed during the development of each individual. So closely do the embryos of the most distinct species belonging to the same class resemble each other, that even Von Baer was unable to decide whether two unlabeled specimens were lizards, birds or mammals. The process of development goes from the general to the special; thus there is generally an advance in organization. In peculiar conditions degeneration may occur. All these facts are explained on the principle of successive slight variations not necessarily or generally supervening very early in life and inherited at a corresponding period; hence it is in the highest degree probable that most embryonic stages show us more or less completely the progenitor of the group in its adult state; and embryology thus rises greatly in interest. Darwin points out that the theory of evolution by natural selection is no more inimical to religion than is that of gravitation, to which the same objection was raised. Since the researches of the last two decades on heredity (q.v.) have brought to light the fact that variations are not in general infinitesimal, but are in general rather of the nature of mutations, the discussion of natural selection has entered on a new stage. The periods which were formerly believed to be essential for the differentiation of a species have been shown to be far too large. On the other hand, the problem how a series of what are apparently arbitrary jumps can lead to the development of such a perfectly adapted organ as a wing is exceedingly difficult to explain, more particularly as it appears that the number of mutations of which an organism is capable, though great, is predetermined in the chromosomes (q.v.) of its cells. This fact has led certain biologists to have recourse to the theory of the inheritance of acquired characteristics, which, indeed, was not foreign to the views of Darwin. The weight of evidence, however, seems to oppose this theory. See EVOLUTION, THEORIES OF; HEREDITY; GENETICS.

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DARWINIAN TUBERCLE, a small raised portion, or tubercle, that may be found on the pinna of the ear. It is said to be present in a number of the primates and by many scientists has been regarded as an evidence of degeneracy in mankind. Different forms of Darwinian tubercles are described by anthropologists, but they have no real special significance.

DAS KÄTCHEN VON HEILBRONN ('Katie of Heilbronn'). This romantic drama by Bernt Heinrich von Kleist, first produced in 1810, long remained one of the favorities in German theatrical repertory. It is the most romantic work of its author, himself perhaps the most romantic of Germany's poet-dramatists, and is a representative product of 'Storm and Stress' in individual and national life. Goethe, who was director of the theatre at Weimar when it was written, refused, at first, to present it, calling it «a jumble of sense and nonsense,» and an abstract criticism of the play amply justifies his judgment. Yet the work has undeniable charm and merit in spite of its faults, or perhaps because of them, since its very exaggeration of romance in situation, characterization and poetic fervor is what has given it its vogue. The quick shifts from darkness to light, from verse to prose, the contrast between the luminous Kätchen who sacrifices everything for love and her wicked rival Kunigunde are typical of Kleist, both of his work and of his life. He himself called «Kätchen von Heilbronn» the obverse of «Penthesilea,» the Amazon-feminist heroine of an earlier play, «her opposite pole, a creature as powerful through submission as Penthesilea is through action.» It is as a type like Griselda that Kätchen survives, not as a story, for the tale of her blind devotion to Graf Wetter von Strahl, of the intrigue and mystery and treachery that bar her path and of her final emergence as a lost Kaisers-tochter are too well-worn for distinction.

EDITH J. R. ISAACS.

DASHEEN, a plant of the genus *Colocasia* of the Arum family. The plants are cultivated for their starchy roots which are cooked and eaten much like the common potato. In recent years they have been introduced and grown extensively in the southern United States. They thrive in regions too warm and in soil too wet for the growth of the potato.

DASHIEL, Robert Laurenson, American clergyman and educator: b. Salisbury, Md., 25 June 1825; d. Newark, N. J., 8 March 1880. He was graduated from Dickinson College in 1846. He was a Methodist pastor in Baltimore, Md., Newark, N. J., Jersey City, N. J., and Orange, N. J. From 1868 to 1871 he was president of Dickinson College. From 1872 until his death he was secretary of the Board of Foreign Missions of the Methodist Episcopal Church. He represented his conference in the General Conferences of 1872 and 1876. His pulpit ability was noteworthy.

DASHKOFF, dăsh'kŏf, **Princess Ekat'erina Romanov'na,** Russian scholar: b. Petrograd 22 March 1743; d. Moscow 16 Jan. 1810. She married Prince Dashkoff when only 15 years old, but was left a widow three years after. She was an intimate friend of the Empress Catherine II, and one of the heads of the conspiracy formed against Peter III, the success of which secured the throne to Catherine. Soon afterward, quarreling with Catherine, she obtained permission to travel, and visited Germany, England, France and Italy, making the acquaintance of many eminent men. On her return the princess was appointed director of the Academy of Arts and Sciences; and in 1783, president of the Russian Academy, established at her own suggestion in imitation of the French Académie. Besides writing several comedies and occasional papers, the Princess Dashkoff was mainly instrumental in inducing the Russian Academy to draw up a dictionary of the Russian language, and herself executed part of the work. On the death of Catherine she was removed from office and retired to Moscow. Consult her autobiography (trans. by Mrs. W. Bradford, London 1840.)

DASS, Peder, or **Petter,** Norwegian poet: b. Nord-Herö, parish of Alstahoog, Nordland, 1647; d. Aug. 1708. He studied at the University of Copenhagen, became pastor of the parish of Alstahoog in 1689 and grew rich from commerce and fisheries, buying for himself the royal domain of Vefsen. He became the most popular poet in Norway, leaving 127 poems of which only 24 are now extant, his masterpiece being a descriptive poem: 'The Trumpet of the Nordland,' written in the Dano-Norwegian dialect. His works were collected by Eriksen (Christiania 1873–77).

DASSY, or **DASSIE,** the name given in South Africa to the rock-rabbit (*Procavia capensis*), the Dutch name for which is klipdas. The name dassy is merely a diminutive in local use, especially in Cape Colony. See Hyrax.

DASYPROCTA, a genus of agoutis (*Dasyproctidæ*), a familiar group of rodent mammals inhabiting Central and South America, and some of the West India Islands. The agoutis are a little larger than the common rabbit, have a rabbit-like head, but with short ears, hooped, pig-like claws, and are swift-footed. They live in the woodland, and search for food by night in the open country. See Aguti.

DASYURE, dăs'ĭ-ūr, a marsupial native to Australasia; and belonging to the family *Dasyuridæ.* Dasyures are the survivors of the fossil forms found in Tertiary strata in South America, and elsewhere; and are allied to the opossum. The hind and fore legs are about equal in length, and the toes are furnished with claws; the long hairy tails are not prehensile. The teeth are fitted for tearing flesh, and there are eight upper incisors. There is no cœcum. The pouch is often rudimentary, and in *Myrmecobius* is absent. The dasyures are chiefly strong, fierce creatures of cat-like propensities, whose depredations have caused heavy losses in farming and ranching districts, so that the colonists of Australasia, more especially those of Tasmania, have nearly exterminated them, by persistent effort. Among them we find the Tasmanian zebra-wolf (*Thylacinus cynocephalus*), a wolf-like creature, rather smaller than the common wolf, with short fur, a long smooth tail and rounded ears. Its color is brownish, and it is barred at the hinder portion of the back and the roots of the tail with dark stripes. It prowls about by night, making raids upon unguarded sheep-folds. By day, it skulks in caverns among the rocks. Another foe to the flocks is the Tasmanian Devil (*Sarcophilus ursinus*). This creature, in size like a badger, in appearance like a bear, is ponderous, powerful, dark-colored, and covered with a coat of long fur. It sleeps by day; and, like the zebra-wolf, seeks its prey by night. It is very strong and ferocious; but despite this, has been successfully put down by the colonists; in fact, it has been nearly exterminated. Another species is the Australian "native cat," a spotted creature, almost as large as a house-cat. It belongs to the genus *Dasyurus,* in which are also several other and smaller species. Perhaps the most interesting of the small Dasyures, is the banded ant-eater (*Myrmecobius fasciatus*) found in western and southern Australia. It is a reddish brown in color, banded posteriorly with white; is about the size of a squirrel, and has a long protrusile tongue for gathering its insect food. It is considered as a practically unmodified representative of certain extinct marsupials found in the Secondary rocks of Europe. It lives in sandy plains, where it finds food in plenty. Other species, small as rats and mice, and living chiefly on insects, birds, eggs, etc., are found in the genus *Phascogale,* and allied genera; and the jerboa-like creature (*Antechinomys laniger*) constitutes another genus, of a single species. It is native to Queensland and New South Wales, but is very rare. See Marsupials.

DATA, Psychological Value of. In applied psychology the use of data is fundamental. Data are necessary for the purpose of getting averages upon which may be based deductions whereby action may be foreseen and properly estimated. In educational psychology the collection of data has been very extensive. It is not only used for the purpose of finding averages, but for the purpose of finding frequency distribution, and measuring variability and relationship. On such data are founded systems of measurement for mental ability. The selections of men from the ranks of the soldiers for officers' training camps is based on the results so obtained. In business psychology the same results are used to promote efficiency founded on known ability. In the psychology of religion, data are the basis for what has been done. So far the data are comparatively meagre except in the one subject of the age of conversion. Even there it is comparatively slight as compared with the data of educational psychology.

DATA OF ETHICS. A book written by Herbert Spencer first issued in 1870. Many subsequent editions have appeared. It teaches the evolutionary idea of ethics. By some writers Spencer's ethics are even called materialistic. He approaches his subject from the physical, biological, physiological and sociological standpoints. He largely ignores the Christian view of a divine authority instructing the judgment, followed by action in complete freedom of choice by the human will.

DATARIA, an office of the Curia Romana (q.v.) from which are sent forth certain classes of papal documents, as dispensations and appointments to Church benefices. The word had its origin in the formula of subscription of letters, for example, *Datæ Kalendis Martiis,* given (or sent) 1 March; that is, the date of the document; and it is the duty of the Dataria to guard against possible errors of either dating or addressing documents, or in the tenor of the documents themselves. •

DATE. See EPOCH; CHRONOLOGY; CALENDAR.

DATE LINE. See INTERNATIONAL DATE LINE.

DATE or **DATE PALM** (*Phœnix dactylifera*), a tall tree of the natural order *Palmaceæ.* It is most notable for its fruit, which is an important part of the daily food of the natives of western Asia and northern Africa, where the tree is indigenous and from whence large quantities of dried dates (the fruit) are exported to other countries. The tree is also cultivated in some other warm countries, including China, Italy, France, Spain and parts of the United States — Florida, New Mexico, Arizona and California, in the last three of which a promising industry seems to be becoming started. The tree, which attains a height of 100 feet, and bears fruit for one or two centuries, is, like other palms, useful in many ways; nearly all its parts are used for something. Date seeds are roasted and used as a substitute for coffee, or ground, and pressed for oil and the pomace used for stock food. The leaves are used for matting, baskets, thatch, etc.; the terminal bud as a vegetable; the wood for fence making and other purposes where great strain is not expected; the fibre of the bark for making rope; but the fruit, which contains proteids, gum and pectin, and is particularly rich in sugar, is the most important part. It is one of the principal sources of wealth in the countries where the date is indigenous. It is believed that the leaves of this palm are the ones referred to in biblical writings, and at the present time the leaves of this palm are largely used upon Palm Sunday among Christians living where the trees abound. The leaves were also symbolical of victory, beauty, etc., among the ancient Greeks and Jews.

Since the male and female flowers are borne on separate trees, enough specimens of staminate flowering trees must be planted to fertilize the blossoms on the others which alone produce fruit. Since the plants obtained from seeds are of unknown sex until they flower, and since the proportion of inferior seedlings to seedlings which bear superior fruit is very large, the date is propagated by means of suckers, since these retain the characteristics of the parent. The young plants are set in sunny situations, in almost any kind of soil where water is within reach of the roots or can be supplied by irrigation. The sandy, alkaline soils of deserts seem more satisfactory than the richer soils necessary for the growth of general crops. The trees are very difficult to make grow after transplanting, because they demand much attention especially as to watering. A loss of 50 per cent is not uncommon even with the best of attention. The surviving trees should commence to bear when about eight years old. The fruit is borne in clusters which hang from the thick crown of large pinnate leaves. Individual trees produce from 300 to 500 pounds or more of fruit in a season. The fruit is eaten both fresh and dried and is divided into soft and dry dates. They vary in color, quality and size.

DATE-PLUM, a common name for plants of the genus *Diospyros,* of the ebony family (*Ebenaceæ*). The genus has about 190 species and is most abundantly represented in Asia. In the United States two species are known, the most common being the persimmon (q.v.), *D. virginiana.* The common date-plum or pishamin, also called the European lotus and the date of Trebizond (*D. lotus*), is a tree 18 to 30 feet high, with oblong shining leaves and small reddish-white flowers, a native of the coasts of the Caspian Sea, northern Africa, etc., but cultivated and naturalized in the south of England. Its fruit is of the size of a cherry, and in favorable climates larger, yellow, sweet and astringent. It is eaten when overripe, like the medlar, or is used for preserves. This fruit has been supposed by some to be the *lotus* (q.v.) of the Lotophagi. *D. mabola* is cultivated as a fruit-tree in Mauritius. *D. kaki,* the Japanese persimmon, is a native of Japan, and occasionally is kept in greenhouses in France and England. The sweetmeat called *figues-caques* is made from this fruit in France. The fruit of some other species is also edible, as, for example, that of *D. decandra* of Cochin-China. See EBONY; PERSIMMON.

DATE-SHELL, or **DATE FISH,** a bivalve shell or its inhabitant of the genus *Pholas,* a kind of mollusk. They bore holes in clay, peat, and soft rocks and in some instances in hard stone, as in columns from the Temple of Serapis, which were brought from Africa to Italy. Species of the date-shell are found in the Mediterranean and its arms, on the coast of California and in a few places on the west shore of the Pacific. Some are edible.

DATHA, American cacique. He governed the province of Chicora, on the east coast of Florida, visited by Lucas Vazquez de Ayallon, auditor of San Domingo, in 1520. He was a giant, and Helps, in the 'Spanish Conquests in America,' says: "His gigantic stature had been artificially produced, for it is said that the Indians of those parts had a method of elongating the bones of children when very young, a practice which they applied to those of royal race."

DATIA. See DUTTEEAH.

DATISCIN, da-tĭs'sĭn, a substance yielded by the bastard hemp, *Datisca cannabina*, a common plant in gardens, indigenous to the Punjab, and largely used in the south of Europe and in Asia for dyeing yellow. It can be extracted from the leaves and roots by exhausting with alcohol, concentrating, adding water, filtering from a resin, crystallizing and purifying the glucoside so obtained. When pure it forms colorless silky needles, which are readily soluble in alcohol, sparingly in ether and in water, and have a bitter taste. It has feeble acid properties, and gives yellow compounds with lead and tin which can be used as dyes. When boiled with dilute acids it is resolved into sugar and *datiscetin*, which crystallizes readily. This is soluble in alcohol and in ether, almost insoluble in water. It also gives a fine yellow color when combined with lead.

DATIVE, in grammar, one of the cases of nouns and pronouns, the usual function of which is to mark the recipient of something given. In English there is no distinctive form for this case; yet when we say, for instance, "give me or him that," "I gave the man a crown," *me, him* and *man* are really in the dative. In Latin, Greek, Sanskrit, German, etc., there are distinct forms for this case.

DATOLITE, dăt'o-līt, or **DATHOLITE,** a basic silicate of boron and calcium, having the formula $H_2O.2CaO.B_2O_3.2SiO_2$, and crystallizing in the monoclinic system. Its crystals are glassy in appearance, white in color (often with a greenish tinge), and transparent or translucent. Before the blow-pipe it melts with intumescence, and gives a green color to the flame. Its hardness is from 5 to 5.5, and its specific gravity is about three. In the United States it occurs in Connecticut, New Jersey and the Lake Superior district. It is also found in the Salisbury Crags near Edinburgh, as well as in Norway, Sweden and other parts of the European continent. The name is from two Greek words that refer to the tendency that one of its massive varieties exhibits, to divide into granular portions. The crystals when polished are used as ornaments.

DATS E IRADIER, Eduardo, Spanish statesman: b. Coruña, 12 Aug. 1856. He studied law at Madrid and became doctor in jurisprudence in 1875. He was elected deputy to the Cortes in 1884, and re-elected in 1891 and 1893. He was early allied with the Conservative Party under Cánovas, but withdrew for a time. In 1887 he became a member of the board of the Madrid Law College, and in 1890–94 served as vice-president of the Royal Academy of Jurisprudence and Legislation. He became Minister of the Interior in Silvela's cabinet and made an exhaustive study of labor conditions during a visit to Catalonia in 1900. In 1902 he was Minister of Justice in the new Conservative cabinet of that year, and in 1905 he was made a member of the Royal Academy of Moral and Political Science. He was mayor of Madrid in 1907, and upon the organization of the new Cortes, he became president of the chamber. In 1913 on the fall of the Liberal ministry of Romanones he became Prime Minister, but was soon after displaced by a Liberal ministry under Canelejas.

DATURA, a genus of plants of the potato family (*Solanaceæ*). It contains about 15 species, widely distributed. The genus is represented in the United States chiefly by coarse weeds naturalized from tropical America. Jamestown or Jimson weed (*D. stramonium*) is said to have received its name from a poisoning that occurred from its use by the settlers of Jamestown, Va. It is also called thorn-apple. It is found in waste places from the eastern seaboard west to Minnesota and Texas. The purple thorn-apple or purple stramonium (*D. tatula*) is also found throughout the same region. An extract from these plants is used in medicine. When taken internally it is a powerful narcotic; medically it is used in mania, convulsions, epilepsy, tic-douloureux, etc. When smoked it palliates the symptoms in asthma. The seeds of some species were used by the aboriginal Americans as narcotics. Some plants of the genus are cultivated for their showy flowers. The seeds of certain species are said to have been used to produce the frenzied ravings of the priests in the Delphic and some other temples. The Peruvians use for the same purpose *D. sanguinea*, manufacturing from it also an intoxicating beverage.

DATURINE, a poisonous alkaloid found in the thorn-apple (*Datura stramonium*), and now known to be identical with atropine.

DAUB, dowp, **Karl,** German Protestant theologian: b. Cassel, Germany, 20 March 1765; d. Heidelberg, Baden, 22 Nov. 1836. He became professor of theology at Heidelberg from 1795. His works include 'Lehrbuch der Katechetik' (1801); 'Theologumena' (1806); 'Die Dogmatische Theologie jetziger Zeit' (1833). He attempted to reconcile philosophy with theology.

DAUBAN, dō-bäṅ, **Jules Joseph,** French painter: b. Paris, 31 May 1822; d. 1908. He was a pupil of Auguste Debay. His taste led him to historical and religious subjects, and his compositions, severe in design and of a great simplicity in the accessories, are somewhat cold and sober in color. He became director of the museum and the School of Fine Arts in Angers in 1849, received a medal in 1864 and the decoration of the Legion of Honor in 1868. Among his works are 'Louis XI, presenting Guillaume de Cerizay as Mayor of Anjou' (1861); 'Reception of a Stranger by the Trappists' (1864), Luxembourg Museum; 'Trappists Exchanging the Kiss of Peace before Communion' (1865), Museum of Angers; 'Madame Roland Going to the Revolutionary Tribunal' (1869); 'Fra Angelico da Fiesole' (1873); and several portraits and decorative paintings. His last important work was six decorative compositions for the church of Quintin (Côtes du Nord).

DAUBENTON, do-bäṅ-tôṅ, **Louis Jean Marie,** French naturalist and physician: b. Montbard, Côte-d'Or, France, 29 May 1716; d. Paris, 31 Dec. 1799. He became celebrated for his participation in the 'Histoire naturelle' by his friend Buffon; the anatomical part of which was prepared by Daubenton with great accuracy, clearness and sagacity. In 1744 he was chosen member of the Academy of Sciences, and enriched its publications by a number of anatomical discoveries, and also by researches concerning the species of animals and their varieties, the improvement of wool, and the treatment of the diseases of animals. He threw much light upon mineralogy, botany and agriculture, and proposed a new method for the classification of minerals. He was the author of numerous works of general utility, 'Instruction pour les bergers' (1782); 'Mémoire sur les indigestions,' and many others. He became professor of natural history in the College of Medicine in 1778 and about seven years after professor of mineralogy in the Museum of Natural History. During the Reign of Terror, when everyone was required to give some evidence of patriotic spirit, he was represented to his section as employed in introducing the Spanish sheep into France.

DAUBENY, dâ'bē-nĭ or dōb'nĭ, **Charles Giles Bridle,** English scientist: b. Stratton, Gloucestershire, 11 Feb. 1795; d. Oxford, 13 Dec. 1867. He was educated at Winchester School and Magdalen College, Oxford, and practised for some years as a physician in Oxford. In 1819 he visited Auvergne, and in 1837 made a scientific visit to the United States. From 1822 to 1855 he was professor of chemistry in the University of Oxford. In 1834 he became professor of botany, and in 1840 of rural economy in the same university. He held the last appointment till his death. His principal works are 'A Description of Active and Extinct Volcanoes' (1826); 'An Introduction to the Atomic Theory' (1831); with a supplement, 1840); 'Mineral and Thermal Waters' (1836); 'Lectures on Agriculture' (1841); 'Sexuality of Plants' (1860); 'Lectures on Climate' (1863).

D'AUBIGNÉ, dō-bēn-yâ, **Jean Henri Merle,** Swiss ecclesiastical historian: b. Eaux-Vives, near Geneva, Switzerland, 16 Aug. 1794; d. Geneva, 21 Oct. 1872. In 1818 he became pastor of the French Protestant church in Hamburg. In 1823 he was appointed court-preacher at Brussels; but after the revolution of 1830 returned to Geneva, and filled the chair of Church history in its theological seminary until his death. The work which has given him a widespread reputation is his 'Histoire de la Réformation au Seizième Siècle' (1835–53), which has been translated into most European tongues. It is written with a devout, fervid sympathy that is often eloquent, although the narrative is too graphic to be everywhere exact. Among his other writings are 'Germany, England and Scotland' (1848); a vindication of Cromwell (1848); 'Trois Siècles de Lutte en Écosse' (1849); and 'Histoire de la Réformation en Europe au Temps de Calvin' (1862–78).

D'AUBIGNÉ, Merle. See D'Aubigné, Jean-Henri Merle.

D'AUBIGNÉ, Théodore Agrippa. See Aubigne, D'.

DAUBIGNY, dō-bēn-yē, **Charles François,** French landscape painter and etcher: b. Paris, 15 Feb. 1817; d. there 19 Feb. 1878. He studied under his father, who was a miniature painter; Paul Delaroche and others; and from 1838 exhibited in the Salon, though his full recognition came only after the artist had reached his 50th year. He devoted himself to close and sympathetic study from nature, working much on the Seine in a houseboat, and developed a style of landscape art marked by singularly unaffected fidelity and originality. In 1853 he gained a first-class medal with his 'Pool of Gylien.' In 1857 he produced his 'Springtime'; in 1861 'The Banks of the Oise'; in 1872 'Windmills at Dordrecht'; and in 1877 his large and very impressive 'Rising Moon.' His 'Sluice in the Valley of Optevoz' (1855) and his 'Vintage' (1863) are in the Luxembourg Gallery. The public galleries of America contain numerous paintings by Daubigny, and small sketches were sold to private collections. He is also known as a book-illustrator and as a vigorous etcher, having produced over 100 plates — some reproductions, others direct from nature, marked by great frankness of method and free painter-like quality. Consult Henriet, 'Daubigny et son œuvre' (1878); Van Dyke, 'Modern French Masters' (1896); Stranahan, 'History of French Art' (1900).

D'AUBUSSON, PIERRE. See Aubusson, Pierre d'.

DAUCUS, dâ'kŭs, the typical genus of the *Umbelliferæ* or carrot family. The genus has about 25 species, two of them growing wild in America. Wild carrot, crow's-nest, or Queen Anne's lace (*D. carota*), is generally a pernicious and abundant weed throughout the Union. It is a native of Asia, naturalized from Europe. It is the original of the cultivated carrot. See Carrot.

DAUDET, dō-dâ, **Alphonse,** French novelist: b. Nimes, 13 May 1840; d. Paris, 16 Dec. 1897. He was educated at the Lyons Lycée and for two years after leaving it supported himself as an usher at Alais. Going to Paris in 1857 he took to writing verse, his first volume being 'Les Amoureuses' (1858), which met with some success. This was followed by other poems, including 'La Double Conversion' (1859), and at this time he also contributed to the *Figaro* and other journals. About 1862 he began writing for the stage, and during the succeeding 10 years or so several dramas by him were represented but only with moderate success. These included 'La Dernière Idole' (1862); 'L'Œillet Blanc' (1865), and 'Le Frère Aîné (1868). Greater public favor was accorded to his 'Lettres de mon moulin,' which appeared in 1866 in a Parisian journal. In 1872 he produced his celebrated 'Les Aventures Prodigieuses de Tartarin de Tarascon,' an amusing satire on the boastfulness so characteristic of the south of France. From this time he published numerous works, some of the best being 'Fromont Jeune et Risler Aîné' (1874); 'Jack' (1876); 'Le Nabab' (1877); 'Les Rois en Exil' (1879); 'Numa Roumestan' (1881); 'L'Évangéliste' (1883); 'Sapho' (1884); 'Tartarin sur les Alpes' (1885), a sequel to 'Les Aventures Prodigieuses'; 'Trente Ans à Paris' (autobiographical) (1887); 'Souvenirs d'un Homme de Lettres' (1889); 'Port Tarascon, dernières Aventures d'Illustre Tartarin' (1890); 'Rose et Ninette' (1892); 'La Menteuse' (1893); 'Entre les Frises et la Rampe' (1894); 'La Petite Paroisse' (1895); 'Contes d'Hiver' (1896); 'L'Enterrement d'une Étoile' (1896); 'Les Mères' (1896); 'Le Trésor d'Arlatan' (1897); 'La Fédor' (1897); and 'Soutien de Famille' (1897). M. Daudet has often been compared with Dickens in his mastery of pathos and humor. Some of his principal works rely mainly on his great powers of caricature for their success.

Literary critics appreciate Daudet for his polished style, his originality and his insight into the foibles of humanity. His unaffected sympathy, somewhat tinged with a certain melodramatic sentimentality, and his saving sense of humor constitute his greatest appeal to the average reader. His works have been translated into English and in this dress have been very popular. A complete edition appeared in Boston in 1900. (See SAPPHO; TARTARIN). Consult Brunetière, ‘Le Roman naturaliste’ (1896); Ratti, G. A., ‘Les Idées morales et littéraires d'Alphonse Daudet d'après ses Œuvres’ (1911); Daudet, L., ‘Alphonse Daudet’ (1898).

DAUDET, Ernest Louis Marie, French novelist and historian: b. Nimes, 31 May 1837. He is a brother of Alphonse Daudet (q.v.). His most notable novels are ‘The Venus of Gordes’; ‘The Bloom of Sin’; ‘Martha.’ He is author of an autobiographical sketch, ‘My Brother and Myself’ (1882). Completely eclipsed in fiction by his brother he devoted his energies to the field of historical research, in which he became known as a prolific and reliable contributor. His noteworthy works are ‘History of the Royalist Conspiracies in the South during the Revolution’ (1881); ‘History of the Emigration’ (1886); ‘Les Bourbons et la Russie pendant la Révolution française’ (1888); ‘Les Récits des Temps révolutionnaires’ (1908); ‘Tragédies et Comédies de l'Histoire’ (1912). Consult Ernest-Charles ‘Les Samedis littéraires’ (Paris 1903).

DAUGHTER OF THE CONFEDERACY. See DAVIS, VARINA ANNE JEFFERSON.

DAUGHTER OF THE REGIMENT, The. Opera comique in two acts by Gaetano Donizetti (libretto by Bayard and St. Georges), first produced at Paris, 11 Feb. 1840. While in most of his operas Donizetti is pure Italian, in this he comes close to the French type of opera. With ‘Don Pasquale’ and ‘L'Elisir d'Amore,’ both of which are buffa operas, it forms the group out of the long list of works accredited to the composer which seems to possess the greatest vitality. The music is vivacious and sparkling, with a raciness born of the combination of French and Italian manner. The deeper note is heard just enough to give the needed contrast, as in Marie's touching farewell song at the end of the first act, one of the finest melodies in Italian opera. The “Rataplan” duet between Marie and the Sergeant, recurring through the latter scenes, the Song of the Regiment, the romance in the second act with the amusing irruptions into the military spirit and the rousing choruses are household favorites. It is one of those strange instances of erroneous first impression that the operá was not successful in Paris after it had gone the rounds of the other European capitals. The rôle of Marie, the vivandière for whom the course of true love is so troubled, is a grateful one and has always been popular with the great artists, such as Jenny Lind, Patti, Sontag and Sembrich. Donizetti has always been famed as a writer of prima donna operas — a reputation not altogether undeserved. In ‘The Daughter of the Regiment’ this claim, in its better sense, is well supported.

LEWIS M. ISAACS.

DAUGHTERS OF THE AMERICAN REVOLUTION, a society composed of women who are descendants of ancestors, any of whom “with unfailing loyalty rendered material aid to the cause of independence as a recognized patriot, as soldier or sailor, or as a civil officer in one of the several colonies or States.” It was organized in Washington, D. C., 11 Oct. 1890. Its objects are to perpetuate the memory of the spirit of the men and women who achieved American independence; to promote institutions for the general diffusion of knowledge; to cherish, maintain and extend the institutions of American freedom; to foster true patriotism and love of country; and to aid in securing for mankind all the blessings of liberty. The society has a membership of 115,865 women, organized into 1455 local chapters. Delegates from all chapters meet in annual congress in Washington in the third week of April. The society has collected many historical relics, and it has also a valuable historical and genealogical library at its headquarters. The National Society was incorporated by Act of Congress in 1896 and, in accordance with that act, reports annually to Congress. The society publishes *The American Monthly Magazine* and also a series of lineage books containing the record of the ancestry of each member of the organization.

DAUGHTERS OF THE CONFEDERACY, United, an association of the widows, wives, mothers, sisters and lineal female descendants of men who served honorably in the army and navy of the Southern States or who gave personal services to the Confederate cause. It was organized at Nashville, Tenn., 10 Sept. 1894, and to date has 1,575 chapters in the United States and one chapter in Mexico City. The organization has about 90,000 members.

DAUGHTERS OF THE HOLLAND DAMES, a colonial society of women, the official title being “The Daughters of Holland Dames, Descendants of the Ancient and Honorable Families of New York,” was incorporated for the purpose of erecting a memorial to commemorate the early Dutch period of our colonial history and to preserve and collect historical documents relating to the same. The headquarters are in New York. This society is not connected with the Holland Dames.

DAUGHTERS OF THE KING, The Order of, a Protestant Episcopal order of women (not to be confounded with the King's Daughters), organized in 1885. The aim of the society is to bring young women within the influence of the Church and to co-operate with the rectors of parishes to that end. The office of the council is in New York. Its constitution is framed as far as it is possible on the terms of the Brotherhood of Saint Andrew, the men's organization of the Protestant Episcopal Church to whose purposes and work it closely corresponds. The membership is about 4,500, with about 415 senior chapters and 50 junior chapters. It holds a triennial convention. Its official organ is *The Royal Cross.*

DAUGHTERS OF THE REVOLUTION, a patriotic society of women in the United States, organized in 1891. Eligibility to membership is restricted to “women who are lineal descendants of an ancestor who was a military or naval or marine officer, soldier, sailor or marine, in actual service under the authority of any of the 13 Colonies or States, or of the Continental Congress, and remained always loyal to such authority, or descendants of one who signed the Declaration of Independence, or of one who as a member of the Continental Congress or of the Congress of any of the Colonies or States, or as an official appointed by or under the authority of any such representative bodies, actually assisted in the establishment of American independence by service rendered during the War of the Revolution, becoming thereby liable to conviction of treason against the government of Great Britain, but remaining always loyal to the authority of the Colonies or States.» There are numerous subordinate State organizations. The total membership is about 4,000.

DAUGHTERS OF 1812. See United States Daughters of 1812, National Society of.

DAULATABAD, dow-lät-ä-bäd' («fortunate city»), India, a town and fort in the Deccan, within the Nizam's dominions, 28 miles northwest of Hyderabad. The fortress consists of a conical rock, 600 feet high, with a wide ditch and an outer wall nearly three miles in circumference. The place surrendered to the Mohammedans in 1294, and Shah Murhammad Tughlak (1324–51) thrice attempted to remove the seat of government hither from Delhi. The fortress has not been garrisoned now for many years and the town has greatly decayed. Pop. about 1,000.

D'AULNOY, dōl'nwā, **Marie Catharine Jumelle de Berneville,** Countess, French writer: b. about 1650; d. 1705. She wrote many romances, long consigned to safe oblivion, but her fame rests securely on her ‘Fairy Tales,’ written in a simple, bright and charming style, not altogether unworthy of Perrault. ‘The White Cat,’ the ‘Yellow Dwarf,’ ‘Finette Cendron,’ and ‘Le Mouton’ have for two centuries been naturalized in the nurseries of Europe and are still familiar figures in pantomime. Her altogether delightful ‘Travels in Spain’ was reissued in New York in 1898.

DAUMER, dow'mėr, **Georg Friedrich,** German poet and philosopher, often referred to under his pen name Eusebius Emmeran: b. Nuremberg, 5 March 1800; d. Würzburg, 14 Dec. 1875. He was educated at the Universities of Erlangen and Leipzig and in 1822–30 was a professor in the Nuremberg Gymnasium. He underwent some remarkable revolutions of thought concerning religion; in his student days leaned strongly to Pietism; next was the declared foe of the Christian religion and about 1859 embraced Catholicism and became one of its foremost champions. He wrote among many other philosophical tractates ‘Hints Toward a System of Speculative Philosophy’ (1831); to his second period belongs: ‘The Fire and Moloch Worship of the Hebrews’ (1842); to his third: ‘My Conversion’ (1859). Of his poetical works, the ‘Flowers of Song from Hafiz’ may be named — a very beautiful transcription of the Oriental poet, with free variations in the very spirit of Hafiz himself. He wrote also ‘Beautiful Souls: a Little Wreath of Legends and Poems’ (1862); ‘Legends and Poems of Saint Mary.’ For a time he was instructor of the celebrated foundling Kaspar Hauser, in regard to whom he published ‘Mittheilungen über Kaspar Hauser’ (1832); ‘Enthülungen über Kaspar Hauser’ (1859); and ‘Kaspar Hauser, sein Wesen, seine Unschuld’ (1873).

DAUMIER, dō'mē-ā', **Honoré,** French caricaturist and painter: b. Marseilles, 26 Feb. 1808; d. Valmondois, 10 Feb. 1879. His father tried to dissuade him from entering the artistic profession by apprenticing him to a *huissier* and later with a bookseller. He managed, however, to master the technique of lithography and entered on his career by making plates for music publishers and illustrations for advertisements. He joined the staff of *La Caricature* under Philipon and started upon his pictorial campaign of satire. Fashion, tittletattle, scandal, politics, blemishes of figure and oddities of character in turn inspired his inexhaustible genius for mockery. Few among his illustrious contemporaries escaped his pencil, and his caricatures had always some strikingly truthful feature about them. His caricature of Louis Philippe as ‘Gargantua’ led to his imprisonment for six months in 1832. *La Caricature* was discontinued soon after, but was replaced by *Charivari,* where Daumier continued his famous social caricatures in a series of sketches known as the ‘Robert Macaire’ series. The Revolution of 1848 turned him toward the political field and suggested two of his most remarkable series, ‘Parliamentary Idylls’ and ‘The Representatives Represented.’ Despite his prodigious activity in the field of caricature — he has left about 3,958 lithographs — he found time for painting. He produced several remarkable works in this field, such as ‘Christ and Apostles,’ at the Ryks Museum in Amsterdam; ‘The Good Samaritan’; ‘Don Quixote and Sancho Panza’; ‘Christ Mocked,’ etc. He is represented in the Louvre by ‘The Thieves and the Ass’ and ‘The Republic,’ also in the museums of Berlin, Bucharest, The Hague, Montreal, Rheims and by two pictures in the Metropolitan Museum, New York. As a painter he was one of the pioneers of naturalism and did not meet with success until shortly before his death, when an exhibition of his works demonstrated the full range of his genius. His ability as a painter has only become generally known since the exhibition of his work in 1900. He was appreciated and loved by his great contemporaries, Victor Hugo, Balzac, Corot, Daubigny, Courbet, Rousseau and Diaz. He became blind in 1877 and in his last days was befriended by Corot, in whose house he died at Valmondois, Seine-et-Oise. Consult the complete catalogue of his lithographs by Hazard and Delfteil (Paris 1904); the biographies by Alexandre (Paris 1890) and Klossowski (Munich 1914) and Geoffroy and Frantz and Uzanne Daumier and Gavarni (London, the *Studio,* 1904). Consult also brief works on his lithographs by Marcel (Paris 1906) and Cary (London 1907) and Champfleury ‘Histoire de la caricature moderne’ (Paris 1872).

DAUN, L. J. C. See Dhaun, Leopold Joseph Maria, Count von.

DAUNOU, dō'noo', **Pierre Claude François,** French statesman: b. Boulogne-sur-Mer, 1761; d. Paris, 1840. He joined the Congregation of the Oratory in 1777. On the outbreak of the Revolution he became a member of the

National Convention. He opposed the execution of Louis XVI and advocated his deportation pending a settlement. He was opposed also to the proscription of the Girondists and was imprisoned and escaped the guillotine only by the downfall of Robespierre. He was first president of the Council of Five Hundred and prepared a program of study for the central schools which was adopted in 1795. He was librarian of the Panthéon in 1801 and added to it the valuable collection of Pius VI. He was archivist of the Empire in 1807 and founded the Bibliothèque des Archives Nationales. He edited the *Journal des Savants* after 1816. He wrote 'Histoire littéraire de la France,' and 'Essai historique sur la puissance temporelle des papes' (1810). Consult Taillandier, 'Documents biographiques sur Daunou' (Paris 1841).

DAUPHIN, dâ'fĭn, Fr. dō-făṅ, the title of the eldest son of the King of France. Dauphin was originally a title held by several of the feudal lords of France and is believed to have originated from the dolphins (Fr. *dauphin*) worn on their helmets or used as a family crest. In 1349 Humbert II, dauphin of Viennois, being childless, transferred his estate, called the Dauphiny (*le Dauphiné*), in the south of France, to Philip of Valois, on condition that the eldest son of the King of France should in future be styled the dauphin and govern this territory. The dauphin, however, retained only the title, the estates having been united with the crown lands. On the death of the dauphin his eldest son inherited this title; if he had no son his eldest brother succeeded him. If the king had no son, as was the case in the reign of Louis XVIII, the title of dauphin was not bestowed on any one; for it was never given to the next prince of the blood and presumptive heir, even if he were the king's brother. The wife of the dauphin was called dauphiness (*dauphine*). The *Delphin* classics (q.v.) were editions made for the use of the dauphin (*in usum delphini*).

DAUPHINÉ, dō'fēn-ā', one of the ancient provinces of France. It was divided into Upper and Lower Dauphiné. It comprised the departments of the Isère, the Hautes-Alpes and part of the Drôme. The capital of the whole was Grenoble. The province constituted a sort of triangle, bounded north by Bresse and Savoie, east by Piedmont, south by Provence and west by the Rhone. After the fall of the Roman Empire, it passed into the control of the Franks and eventually became part of the new Burgundian kingdom of Arles. From 1032 until the middle of the 14th century it was in the possession of Germany. It was bequeathed to France by the lords of the kingdom and for the next century was governed as a separate province by the eldest son of the King of France, when it was finally made part of the kingdom of France. The Huguenots made this place their stronghold during the civil wars.

DAURAT, dō-rä', **Jean**, French scholar: b. about 1510; d. 1588. He became president of the Collége Coqueret, where he superintended the studies of Ronsard, Du Bellay, Baif, and Belleau. These poets he carefully trained for the task of reforming the vernacular, and ennobling French literature by the imitation of Greek and Latin models. He wrote nothing of importance in French, but devoted himself to guiding and stimulating the other members of the Pléiade, or seven great poets of the age, in whose works his learning and enthusiasm bore rich and enduring fruit. Consult Marty-Labeaux, in 'Pléiade française' (Paris 1875).

DAUTHENDEY, Max, German poet: b. Würzburg, 1867. He is descended from an old family of the nobility, which came to Germany from France and England in the 16th century. His father achieved some distinction as a pupil of Daguerre in Paris and subsequently as court photographer in Saint Petersburg. From that city he migrated to Würzburg where in 1867 his son was born. Of a highly imaginative disposition from his earliest childhood, young Dauthendey exhibited no little aptitude for painting, although his strongest inclination lay in the direction of poetry, to which he soon decided to devote himself. He never attended the university, but pursued his studies at the Gymnasium of his native city far enough to qualify for the shorter, one-year term of military service. An inveterate traveler, he visited Paris, England and Sicily in 1896, Mexico the following year, Greece in 1898, and in 1906 made a trip around the world. The poetic chronicle of his impressions from these journeys is his 'Die geflügelte Erde' (Munich 1910), which bears the subtitle 'A Song of Love and the Wonders of the Seven Seas' and ranges from the fishmarket of Cairo to the sky-scrapers of New York. Dauthendey is a lyricist of some originality and power, although it must be said that his earlier poems ('Ultra Violett,' 1893), novels and plays ('Kind,' 'Glück,' 'Sehnsucht,' 1895) are marred by excessive striving after a bizarre and fantastic virtuosity. Since 1907 he has produced a considerable bulk of poetry, of which the best is probably contained in his 'Insichversunkene Lieder im Laub' (1908). Perhaps the most agreeable quality in his verse is his delicate nature-sense. His drama 'Ein Schatten fiel über den Tisch' (1911) is a sordid exposition of marital infelicity. Among other collections of his lyrics and longer works are 'Reliquien' (1899); 'Liebeslieder' (1905); 'Singsangbuch' (1907); 'Lachen und Sterben,' two one-act plays (1911); and 'Der Geist meines Vaters' (1912), which purports to be a history of his family.

WILLIAM A. BRAUN.

DAUW, dä, or **PEECHI** (*Equus burchelli*), an animal closely resembling the zebra, which inhabits the plains of southern Africa, particularly to the north of the Orange River. It is about the size of an ass, but more delicately formed. Its general color is a pale brown, with grayish-white on the abdomen and inner parts of the limbs. Its head, neck, and body, and the upper parts of its limbs are striped like the zebra, but the stripes are not so dark in color. It migrates periodically in search of food, and in times of scarcity visits the cultivated lands and makes havoc of the crops. It has been tamed to some extent, but its temper cannot be relied on. The Dutch colonists call it Bonte-quagga. It is known also as Burchell's zebra. See ZEBRA.

DAVAO, dä-vä'ō, Philippines, a province in the southeastern part of the island of Mindanao; area 8,976 square miles; with dependent islands 9,171 square miles. Most of the communication between towns and villages is by sea, as almost all are on the coast; there are a few roads, and the United States troops have done much to improve them. Hemp, coffee, tobacco, rice, and corn are cultivated; the cinnamon tree, the betel nut, cloves, and nutmeg grow without cultivation; large numbers of horses, cattle and hogs are raised. There are indications of deposits of coal and some gold, and there are many valuable forests, well watered by numerous streams. Davao, the chief town, is situated on a bay of the west coast of the gulf of Davao. Davao was occupied by United States troops in December 1899, and was given civil government in 1903.

DAVENANT, John, English clergyman and author: b. London about 1570; d. 1641. He was educated at Queen's College, Cambridge, and in 1597 accepted a fellowship in the college. In 1609 he became Lady Margaret Professor of Divinity. The same year also he was advanced to the degree of D.D. In 1614 he became Master of his college. The greatest honor of his life came to him in 1618 when he was appointed as one of the four clergymen who were sent from England to attend the meeting of the Synod of Dort. In 1621 he became Bishop of the See of Salisbury. He incurred the displeasure of King James I by preaching before him on the subject of predestination, a subject which was not allowed to be discussed according to royal order. Charges were preferred against him and he had to humble himself before the king. He was one of the great scholars of the time. According to the custom then in vogue he wrote his works in Latin. His ‘Treatise on Justification’ has been translated into English (2 vols., 1844–46). His most noted work was a commentary on the Epistle to the Colossians.

DAVENANT, Sir William, English poet and dramatist: b. Oxford, February 1606; d. London, 7 April 1668. He was employed in preparing several masques for the entertainment of the court; and on the death of Ben Jonson in 1637, succeeded to the vacant laurel. On hostilities breaking out between Charles I and the Parliament, Davenant displayed his attachment to the royal cause. At the siege of Gloucester in 1643, he was knighted by the king; and on the decline of the royal cause retired to France, where he became a Roman Catholic, and began the composition of his principal work, a heroic poem, entitled ‘Gondibert.’ An attempt which he afterward made to lead a French colony to Virginia had nearly proved fatal to him. The ship in which he had sailed from Normandy was captured by a cruiser in the service of the English Parliament, and carried into the Isle of Wight, where Davenant was imprisoned in Cowes Castle. In this forlorn captivity, from which he had but little hope of escaping alive, he composed the third book of ‘Gondibert.’ In October 1650 he was removed to London for trial before the high commission court. His life is said to have been preserved by the interposition of Milton. There is a corresponding tradition, that Davenant repaid the good offices of Milton by protecting the republican poet after the Restoration. On the return of Charles II to England the stage was re-established with renewed splendor, and Davenant became patentee of a theatre in Lincoln's Inn Fields. He continued to employ his pen and his talents as a theatrical writer and manager till his death. The introduction of opera on the English stage, and women in female rôles has been ascribed to him. He was buried in Westminster Abbey. His works consist of dramas, masques, addresses, and the epic ‘Gondibert,’ which was never finished; but he is remembered chiefly by the reconstruction of Shakespeare's ‘Tempest,’ in which he was engaged along with Dryden, a work which long held the stage in place of the original, although unequivocally condemned by modern criticism as a vulgar and degraded version of a drama which stood in need of no such emendation. His plays were edited by Laing and Maidment (5 vols., Edinburgh, 1872–74).

DAVENPORT, Charles Benedict, American biologist: b. Stamford, Conn., 1 June 1866. He was graduated at the Brooklyn Polytechnic Institute in 1886, at Harvard in 1889, and took the degree of Ph.D. at the latter place in 1892. In 1888 he began to teach at Harvard, where he was instructor in zoölogy until 1899. In 1904 he became director of the station for experimental evolution at Cold Spring Harbor, L. I., and in 1899–1904 was assistant professor of zoölogy at the University of Chicago. In 1906 he was president of the American Society of Naturalists. His works include ‘Observations on Budding in Paludicella and Some Other Bryozoa’ (1891); ‘On Urnatella Gracilis’ (1893); ‘Experimental Morphology’ (1897–99); ‘Statistical Methods, with Special References to Biological Variation’ (1899); ‘Introduction to Zoölogy’, with Gertrude Crotty Davenport (1900); ‘Inheritance in Poultry’ (1906); ‘Inheritance of Characteristics in Domestic Fowl’ (1909); ‘Heredity of Skin-Color in Negro-White Crosses’ (1913); ‘Heredity in Relation to Eugenics’ (1913); ‘Eugenics’ (1910); ‘The Feebly Inhibited’ (1915).

DAVENPORT, Cyril James, English authority on bookbinding: b. Stirling, Scotland, 5 June 1848. He became an official of the British Museum 1868, and became superintendent of bookbinding there: ‘The English Regalia’ (1897); ‘Royal English Bookbindings’ (1892); ‘Cantor Lectures on Decorative Bookbindings’ (1898); ‘English Embroidered Bookbindings’ (1899); ‘Cantor Lectures on Cameos’ (1900); ‘Life of T. Berthelet’ (1900); ‘Personal Jewelry’ (1902); ‘Mezzotints’ (1903); Bagford's Notes on Bookbindings’ (1904); ‘History of the Book’ (1908); ‘English Heraldic Book-stamps’ (1909); ‘Cameo Book-stamps’ (1911); ‘Castor Lectures on Miniatures’ (1913); ‘English Heraldry’ (1914).

DAVENPORT, Edward Loomis, American actor: b. Boston, 15 Nov. 1814; d. Canton, Pa., 1 Sept. 1877. His first appearance was made in 1836 at Providence, R. I., as Parson Will in ‘Sir Giles Overreach’ with Junius Brutus Booth as Sir Giles. In 1838 he played in Philadelphia. He soon became a leading performer in comedy, melodrama and tragedy. Up to 1847 he appeared chiefly in Boston. In that year he went to England with Mrs. Mowatt, there playing Claude Melnotte in ‘The Lady of Lyons,’ with Mrs. Mowatt as the Pauline. For two seasons he supported W. C. Macready. In 1854 he returned to the United States, where he traveled extensively, playing especially Shakespearean parts and those in dramatizations of Dickens. As Brutus in ‘Julius Cæsar’ and Bill Sykes in ‘Oliver Twist’ he was equally successful. Among his other characters were Sir Giles Overreach and Hamlet. In 1859 he became manager of the Howard Athenæum, Boston, and in 1869 of the Chestnut Street Theatre, Philadelphia. His versatility and finish were notable. Consult Edgett, ‘E. L. Davenport’ (1901; Dunlap Society Pub., new series, No. 14); Moses, M. J., ‘Famous Actor-Families in America’ (New York 1906).

DAVENPORT, Eugene, American agriculturist and educator: b. Woodland, Mich., 20 June 1856. He was graduated from Michigan Agricultural College in 1878; engaged in farming 1878–89; was professor of agriculture in the Michigan Agricultural College, 1889–91; president of Agricultural College, Sao Paulo, Brazil, 1891–92; dean of College of Agriculture of the University of Illinois, since 1895, and director of Agricultural Experiment Station, since 1896; professor of animal husbandry 1895–1901; professor of thremmatology since 1901. In Illinois he did particularly important work in investigations of soil fertility. Member of the Authors' Club, London; fellow of the American Association for the Advancement of Science. Author: ‘Principles of Breeding’; ‘Domesticated Animals and Plants’; ‘Education for Efficiency.’

DAVENPORT, Fanny Lily Gypsy, American actress: b. London, 10 April 1850; d. Duxbury, Mass., 26 Sept. 1898. Her first appearance on the stage was in 1857 at the Howard Athenæum in Boston, then under the management of her father, E. L. Davenport (q.v.). Her real début was at Niblo's Garden in 1862, as King of Spain in ‘Faint Heart Never Won Fair Lady.’ Later she came under the notice of Augustin Daly, and joined his Fifth Avenue Theatre in 1869. She played during her career in the theatres of all the large cities in the United States. Her most noted rôles were in ‘La Tosca,’ ‘Giaconda,’ ‘Fedora,’ and ‘Cleopatra.’ She was married in 1879 to Edwin H. Price, but was divorced and subsequently married Melbourne McDowell, an actor of leading rôles in her company. In 1897 she produced ‘A Soldier of France,’ a play with Joan of Arc as the heroine. It was a failure and this is believed to have hastened her last illness. Her last appearance was on the stage of the Chicago Grand Opera House, 25 March 1898. Consult McKay and Wingate ‘Famous American Actors of To-Day’ (New York 1896), and Moses, Montrose, J., ‘Famous Actor-Families in America’ (ib. 1906).

DAVENPORT, Henry Kallock, American naval officer: b. Savannah, Ga., 10 Dec. 1820; d. Franzensbad, Bohemia, 18 Aug. 1872. He entered the navy in 1838, and in 1844, as passed midshipman, became connected with the coast survey. In 1849–53 he was in the mail-steamship service, subsequently was on sea duty with various squadrons, and in 1856 participated in the capture of the Barrier forts, Canton River, China. During the Civil War he commanded the steamer *Hetzel* in 1861–64, being in 1862–64 senior officer in command of the sounds of North Carolina. Promoted captain in 1868, he was assigned to the command of the *Congress* of the European squadron in 1870.

DAVENPORT, Herbert Joseph, American educator and publicist: b. Wilmington, Vt., 10 Aug. 1861. He was educated at the University of South Dakota, and the Harvard Law School, and from 1899 to 1902 was principal of the high school at Lincoln, Neb. He was instructor in political economy at the University of Chicago 1902–08 and in the latter year was made head of the department of political economy at the University of Missouri. He has published ‘Outlines of Economic Theory’ (1896); ‘Elementary Economic Theory’ (1898); ‘Principles of Grammar’ (with Emerson, 1898); ‘Value and Distribution’ (1908); ‘Economics of Enterprise’ (1913), and contributions to economic journals.

DAVENPORT, John, American Puritan clergyman: b. Coventry, England, 1597; d. Boston, Mass., 15 March 1670. Educated at Oxford, he became chaplain of Hilton Castle, near Durham, later was made minister of Saint Stephen's Church, London (1616–33), and there attained a considerable reputation as a preacher. His Puritanical principles and views ere long brought him into conflict with Archbishop Laud, and in 1633 he withdrew from the English Church, and removed to Holland, where he became colleague of the Rev. John Paget, pastor of the Puritan church at Amsterdam. In 1636, however, he returned to England, where he was very active in obtaining the charter of the Massachusetts colony. He arrived in Boston in June 1637, sat with the synod of Cambridge in August, and in March 1638 sailed with the band of colonists that founded New Haven (Quinnipiac). Here he was extremely influential in civil as well as ecclesiastical affairs.. He was minister there for 30 years, and aided in establishing the system of civil polity, which began by the declaration that «all of them would be ordered by the rules which the Scriptures held forth to them.» On 4 June 1649, holding their constituent assembly in a barn, the «free planters» resolved that church members only should be burgesses, and Davenport was chosen one of the «seven pillars» to support the ordinance of civil government. He exhorted the governor to judge justly, and the «cause that is too hard for you to bring it to me.» Annual elections were ordained, and God's word established as the only rule in public affairs. In his carefulness in regard to the admission of members to the Church, he held in reality also the keys of all political power. When the messengers of the king, who had come to New England in pursuit of Goffe and Whalley, the regicide judges of Charles I, approached New Haven, he hid the fugitives in his house, and preached to his congregation from Isaiah xvi, 3 and 4; «Hide the outcasts: betray not him that wandereth. Let mine outcasts dwell with thee, Moab: be thou a covert to them from the face of the spoiler.» After the death of Wilson, the pastor in Boston, in 1667, he removed there to succeed him. He was installed in December 1668. His election caused a division in the congregation. Those who opposed his views on the «half-way covenant» withdrew and organized the Old South Church. The controversy went on for many years. Among his publications are 'Discourse About Civil Government in a New Plantation Whose Design is Religion' (1663); 'The Knowledge of Christ Indispensably Required of All Men Who Would be Saved' (1653); 'A Catechism, containing the Chief Heads of Christian Religion' (with Hooke 1659); 'The Saints' Anchor-Hold' (1661); 'The Power of Congregational Churches Asserted and Vindicated' (1672). He was also an editor of the works of Dr. John Preston, for some time leader of the English Puritans. Consult Mather, 'Magnalia' (1702), and Dexter, 'Sketch of the Life and Writings of Davenport' ('Papers' of the New Haven Colony Hist. Soc., Vol. II, New Haven, 1877).

DAVENPORT, Richard Graham, American naval officer: b. Washington, D. C., 11 Jan. 1849. In 1869 he was graduated at the United States Naval Academy, was commissioned ensign in the navy, 12 July 1870; promoted through the various grades, retiring after more than 42 years' active service, 30 June 1907, as commodore, while in command of the *Georgia*. His various assignments included those of aid to the rear-admiral representing the Navy Department at the Centennial Exposition, Philadelphia in 1876, temporary duty at the Chicago Exposition of 1893, member of the Board of Civil Service Examiners for nautical experts, president of the permanent general court martial, also navigation and equipment officer and senior member of the board of inspection at the navy yard, Washington, member of the naval retiring board, assistant to the chief of the Bureau of Navigation, and at various times chief of divisions of the Hydrographic Office. During the war with Spain he was second in command of the fleet blockading the coast of Cuba, and later was commander-in-chief of the Eastern Squadron. In 1898-1899 he made a biological survey of the waters around Porto Rico and vicinity. He assisted in revising and editing many sailing directions and nautical books, published by the United States Hydrographic Office.

DAVENPORT, Robert, English poet and dramatist: flourished about 1623; d. after 1640. He is known only through his 'A Crowne for a Conqueror; and Too Late to Call Backe Yesterday. Two Poems, the One Divine, the Other Morall' (1623); 'King John and Matilda' (1655), a tragedy; and two comedies: 'A New Trick to Cheat the Divell' (1639), and 'The City Night Cap' (printed 1661). That he was associated with Shakespeare in producing parts 1 and 2 of 'Henry VI' seems established; and it is almost certain that he is the author of a play called 'The Pirate.'

DAVENPORT, William Edwards, American social worker: b. North Stamford, Conn., 31 Aug. 1862. He was educated at the Brooklyn Polytechnic Institute 1875–81; and was a special student at the Union Theological Seminary, 1897–99. In 1901 he founded the Brooklyn Italian Settlement, which with other organizations was consolidated in 1910 as the United Neighborhood Guild. In 1902, 1904, and again in 1909 he was foreign correspondent for the Brooklyn *Eagle* and the New York *Evening Post*. He is well known as a lecturer on subjects relating to Italian immigration. He has published 'The New Dispensation' (1884); 'Visions of the City' (1884); 'The Perpetual Fire' (1886); 'The Praise of Plymouth' (1892); 'The Poet and His Friends' (1893); 'Beecher-An Ode' (1891); 'Poetical Sermons' (1896); 'The Beggar Man of Brooklyn Heights' (1904); 'More Outcries from Brooklyn Hollow' (1905); 'Moral Effects of the Messina Earthquake' (1910), and contributions to various periodicals.

DAVENPORT BROTHERS. IRA E. (b. 1839) and WILLIAM H. (b. 1841). So-called "mediums," who professed to be adepts in spiritistic arts, and who, by their skill in performing various feats and their clever deceptions, gained many followers. They flourished in 1845–65, but were finally exposed as impostors. Consult Abbot, 'The Davenport Brothers' (1864) and Barkas, 'Lecture on the Brothers Davenport' (1864).

DAVENPORT, Iowa, city of Scott County, of which it is the county-seat, on the western bank of the Mississippi, opposite Rock Island, Ill., 330 miles above Saint Louis, and 184 miles west by south of Chicago, on the Burlington, Cedar Rapids and Northern, the Chicago, Milwaukee and Saint Paul, the Chicago, Rock Island and Pacific and other railways. It is pleasantly situated at the foot of the Upper Rapids of the Mississippi, on the slope of a steep bluff which extends for three miles along the river and commands an extensive view. It is connected with the Illinois shore by an iron railway and carriage bridge, built in part by the Federal government, and costing $1,200,000, and an iron railway bridge costing $800,000. On Rock Island, which is crossed by the former structure, are the central United States arsenal and armory, military headquarters and other government buildings. The surrounding region is important both agriculturally and for its coal mines. Davenport ships large quantities of farm produce, river-packets from Saint Paul to Saint Louis furnishing means of transportation in addition to that of the railways. The flour and grain business is an important one. Among the numerous manufactured products are lumber and planing-mill products, brick and stone, bread and other bakery products, carriages and wagons, agricultural implements, woolen goods, glucose and its products, foundry and machine-shop products, cordage, pottery, furniture, cigars and cooperage products. Wholesale slaughtering and meat-packing is also carried on here. The United States census of manufactures for 1914 showed for Davenport 231 industrial establishments of factory grade, employing 5,292 persons, of whom 3,958 were wage earners, receiving annually $2,402,000 in wages. The capital invested totaled $13,413,000, and the year's output was valued at $17,173,000; of this, $7,057,000 was the value added by manufacture.

Davenport has an Academy of Natural Sciences, the organization having been begun 14 Dec. 1867; Saint Luke's, Mercy and other hospitals; a public library; two opera-houses; a Masonic temple and other important buildings. It is the seat of Saint Ambrose College and other educational institutions, and of the State Orphanage; and it is an episcopal see of the Roman Catholic Church and the Protestant Episcopal Church. The Academy of Natural Sciences regularly publishes 'Proceedings,' and has a large scientific library and a fine collection of mound-builder relics.

Davenport was founded in 1835, in the autumn of which year a company, led by Col. George Davenport, long a resident on Rock Island, was formed for the purchase of a site. In 1838 it was incorporated as a town, and in 1851 a city charter was obtained from the legislature and adopted. The Chicago and Rock Island Railway was chartered in 1851 and completed in February 1854. The government is by a mayor, biennially elected, and a city council, comprising the mayor and aldermen elected by wards and at large. The annual income is about $540,000; the expenditure is $500,000. Pop. 47,000.

DAVID, 2d king of Israel, shepherd and harpist, royal armor bearer and warrior, exile and monarch, psalmist and conqueror. Biblical sources present a strictly historical picture of one of the leading characters in Scripture, embellished in later legends, rabbinical and Mohammedan. According to 1 Chron. xl, 15, he was the youngest of the seven sons of Jesse of Bethlehem, or as stated in 1 Sam. xvi, 10, and following xvii, 12, the youngest of the eight sons. Less rugged than his brothers, he kept his father's sheep, but showed daring courage in their defense. His fame as singer and player was widespread, and was to occasion his summons to the court to cure Saul's chronic melancholy. His playing on the harp relieved the despondent king, who grew fond of the youth and made him armor-bearer. David's prowess in the constant struggles with the Philistines gained him increasing popular favor, Saul's daughter Michal as wife and his son Jonathan as close friend. But with a king's proverbial fickleness, Saul's fondness changed to envy and hatred, and David fled for safety to the priests of Nob, all of whom, except one, were put to death as traitors by the king. The fugitive now headed a band of resolute men who secured Keilah when threatened by the Philistines but could not make stand against Saul. Varied adventures followed, in one of which he spared the king's life, when he sought refuge among the Philistines and became a vassal of Achish of Gath, receiving Ziglag as residence, where he ruled four months. Then came the luckless battle of Gilboa, with Saul and his three sons slain, and Israel once again under Philistine sway, although Abner, Saul's general, succeeded in founding a small kingdom east of the Jordan in Mahanaim for Saul's son Ishba'al or Ishbosheth, as the name appears in Samuel.

At this crisis, David resolved to return to Israel, and was anointed at Hebron as tribal king of Judea, after having begun communications with its tribes and families. He did not abandon, however, his relations as vassal of the Philistines. For seven years and a half he continued this arrangement when events rapidly brought about the logical result. Abner's defeat at Gideon, while attempting to conquer for Saul's son David's small kingdom; that general's defection to David and subsequent death at the hands of David's chieftain Joab, and the murder of Ishba'al;— all this induced Jonathan's young lame son Mephibosheth to offer David the vacant throne, and his anointment followed. The next step was to free Israel from the yoke of the Philistines, which was accomplished after a long series of sanguinary battles. Then he planned to secure another centre for his kingdom, instead of at Hebron, which was too far south; and without much delay he conquered from the Canaanite tribe of the Jebusites the city and stronghold of Jerusalem. With solemn services the Ark of the Covenant was transferred, and in memory of its journeyings in the wilderness it was at first placed in a tent. It was the prophet Nathan who dissuaded David at that time from building for it a temple at Jerusalem. Despite his triumphs on the battlefield, David retained his sense of humility and yielded to the prophet in a memorable episode (2 Sam. vii, 1–17).

While details are scanty of David's political and military activity as ruler, Ammon, Edom and Moab and their Aramean neighbors on the north were conquered and made tributary, his kingdom thus becoming the most powerful between the Nile and the Euphrates. But now at the height of his fame, David revealed his moral weakness in the incident with Bathsheba, whose husband he indirectly caused to be slain. There followed quickly the episode of his eldest son Amnon and stepsister Tamar, which led to Amnon's death by Absalom, her full brother. Absalom's rebellion next ensued, and his death at the hand of Joab, against David's express command. Much bitterness arose with the Judeans, due to internal jealousy among the tribes not yet wholly unified, which David was unable to counteract. Sudden revolt spread which might have proved more serious, had it not been promptly quelled by Joab. The only further cloud on David's remaining years was occasioned by the question of his successor. Adonijah, now the eldest of his sons, had been allowed by David to appear officially in that rôle; but Bathsheba strove to secure the honor for her son Solomon, the youngest. David, who had now grown weak and credulous, believed the rumor that Adonijah had already proclaimed himself king. Hence he was induced to present Solomon to the people, with full ceremonial, and had him anointed as king. He died soon after in his 70th year, having reigned 33 years at Jerusalem.

The outline of David's life and work as here presented is based on 1 Sam. xvi to 1 Kings xi, but a somewhat different impression is given in 1 Chronicles, which, omitting features that might be regarded as doubtful and offensive, stresses his activity in the organization of the Temple service, the gathering of material for the structure, the planning of every detail, the arrangement of the priests and ritual, subordinate functionaries as well as judges and officials, together with ordinances referring to military matters and the royal lands. Hence arose the tradition of David as the founder of Israel's religious poetry. Although only 73 of the psalms have special headings assigning their authorship to him, the entire Psalms are credited as Davidic, which modern criticism disputes. His literary skill and dramatic power attained their highest mark in the dirge on the deaths of Saul and Jonathan (2 Sam. i, 19–27). Apart from his genius as poet, he gave Israel its national unity and character, developing a nation out of a collection of tribes and families. In all its subsequent history, with every change in condition and environment, the national idea was never wholly lost. It is not surprising then, such was the glory of his reign and the strength of his personality, with its human weaknesses which were never extenuated but frankly stated and bore their full penalty in countless sorrows and struggles, that his name belongs to the immortals of Israel and has become interwoven with visions of the future, rising into roseate clouds of saga in many a rabbinical story and later Mohammedan legend.

Bibliography.— Cited portions of the Old Testament tell the record of his life. For Davidic legends consult Ginzberg, L., 'The Legends of the Jews' (Vol. IV, pp. 81–121); Weil, 'Biblische Legenden der Muselmänner'; Grünbaum, Max, 'Sprach und Sagenkund' (pp. 511 ff).

ABRAM S. ISAACS.

DAVID, Saint (Welsh, DEWI), patron saint of Wales: d. 601. He was archbishop of Caerleon and afterward of Menevia, now Saint David's. He was celebrated for his piety, and many legends are told of his miraculous powers. Several theological treatises are ascribed to him. He was canonized in 1120. Consult Rice Rees, 'An Essay on the Welsh Saints' (London 1836).

DAVID I (often called SAINT DAVID), king of Scotland: b. about 1080; d. Carlisle, England, 24 May 1153. He was the youngest son of Malcolm Canmore and Saint Margaret. He succeeded his brother, Alexander the Fierce, in 1124. He married Matilda, grandniece of William the Conqueror; and was Earl of Northumberland and Huntingdon when called to the Scottish throne. On the death of Henry I, king of England, he maintained the claim of his niece Matilda against King Stephen, and seized Carlisle, but was defeated at the battle of Northallerton in 1138. He devoted the rest of his reign to the introduction of English civilization into Scotland. He built many castles and founded five bishoprics and many monasteries. He forwarded the process of feudalization which had been begun by his predecessors. He introduced legislation whereby commerce and manufactures were greatly benefited. Much of this is contained in 'The Acts of the Parliament of Scotland' (Vol. I, Edinburgh 1844). Consult Robertson, 'Scotland under her Early Kings' (2 vols., Edinburgh 1862) and Skene, 'Celtic Scotland' (3 vols., ib. 1876–80).

DAVID II, king of Scotland: b. Dunfermline, Scotland, 5 March 1324; d. Edinburgh, 22 Feb. 1371. He was the son of Robert Bruce (q.v.), and succeeded to the throne in 1329. On the death of his father he was acknowledged by the great part of the nation. Edward Baliol, however, the son of John Baliol, formed a party for the purpose of supporting his pretensions to the crown; he was backed by Edward III of England. Battles were frequent, and at first Baliol was successful; but eventually David's supporters succeeded in driving him from Scotland. David and his queen, who had taken refuge in France, now returned to Scotland and took the reins of government into his own hands. Still, however, the war was carried on with England with increasing rancor, till at length David was made prisoner at the battle of Neville's Cross (1346). After being detained in captivity for 11 years he was ransomed for 100,000 marks. David returned to Scotland but the kingdom was so poor that it was found impossible to raise the ransom. A few instalments were paid and David sought to be rid of further liability in the matter by offering to make Edward III, or one of his sons, his successor in Scotland. The Scottish Parliament indignantly rejected all proposals of this nature, but David treated secretly with Edward III over the matter. He left no children and was succeeded by his nephew, Robert II. As a ruler he was weak and incapable, lacking the patriotic spirit which animated his father. Consult 'Chronica gentis Scotorum', ed. by W. F. Skene (Edinburgh 1872'; Burton, 'History of Scotland' (ib. 1905); Lang, A., 'History of Scotland' (ib. 1900).

DAVID, dä-vēd, **Armand,** French abbé, naturalist and missionary: b. Espelette, Basses-Pyrénées, 7 Sept. 1826. He entered the congregation of the Lazarists in 1848, teaching the natural sciences for some time at Savone, and going, in 1862, to China, where he made an enormous collection of plants, minerals and animals, which he sent to the Museum in Paris. In 1866 he undertook a new exploration, chiefly through Mongolia and eastern Tibet, discovering many new genera and species of flora and fauna. In 1872 he made a third voyage to China, lasting two years. Besides the accounts of his journeys, appearing in the archives of the Museum under the title of 'Journal of My Third Voyage of Exploration in the Chinese Empire' (2 vols., maps, 1875), he left many works on natural history, among which are 'The Birds of China' (with 24 plates 1877) and 'Plantæ Davidianæ ex Sinorum Imperio' (1890).

DAVID, Christian, Moravian missionary: b. Sinftleben, Moravia, 31 Dec. 1690; d. Herrnhut, 3 Feb. 1751. At first a Roman Catholic, he was converted to Lutheran doctrines and in 1717 became a Moravian. In 1722 he was the leader of the Moravians who took refuge from persecution with Count Zinzendorf and founded their settlement at Herrnhut. In 1733 he went to Greenland, establishing the first mission there; he later made several visits to Greenland, as well as missionary journeys to Denmark, Holland, Livonia and England. Consult Thompson, 'Moravian Missions' (New York 1882). See MORAVIANS.

DAVID, Félicien Cesar, French musician and composer: b. Cadenet, Vaucluse, 13 April 1810; d. Saint Germain, near Paris, 29 Aug. 1876. After some vicissitudes he entered the Paris Conservatoire in 1830, and became an ardent disciple of Saint Simon, Enfantin and other social speculators. In 1832, with a few companions, he went to the East in order to realize his dreams of a perfect life, but returned disappointed in 1835. He then published his 'Mélodies Orientales,' and soon after his most successful work, the ode-symphony 'Le Désert' (1844). His other works include many compositions for strings and for the pianoforte, and 'Moïse sur le Sinai' (1846); 'Christophe Colombe' (1847); 'L'Eden' (1848); 'La Perle du Brésil' (1851); 'Herculanum' (1859) and 'Lalla Rookh' (1863). In 1862 he was made an officer of the Legion of Honor, and succeeded Berlioz at the Institute in 1869 and became librarian of the Conservatory of Paris. His work abounds in felicitous and melodious expression, and is pre-eminently marked by the qualities characteristic of French music. Consult Azevedo, A., ‹Félicien David› (Paris 1863) and Brancour, R., ‹Félicien David› (ib. 1908).

DAVID, Ferdinand, German violinist: b. Hamburg, 19 June 1810; d. near Klosters, Swiss Alps, 18 July 1873. He was a pupil of Spohr; made his début in 1825; and became leader of Gewandhaus Concerts, Leipzig 1836. He was a friend of Mendelssohn and the teacher of Joachim and Wilhelmj. Among his compositions the five violin concertos, a number of variations and other concert pieces for the violin hold the first rank. It has been truly said that the publication of his ‹Hohe Schule des Violinspiels› marked an epoch in the development of modern violin-playing. In 1843 he became first instructor of violin at the new Leipzig Conservatory. Consult Bellaigue, C., ‹Études musicales et nouvelles silhouettes des musiciens› (Paris 1898) and Eckard, J., ‹Ferdinand David und die Familie Mendelssohn› (Leipzig 1889).

DAVID, dä'vĕt, Gerard (GHEERARDT DAVIT), Dutch painter: b. Oudewater about 1460; d. Bruges, 13 Aug. 1523. He studied with Dutch masters, perhaps with Aelbert Ouwater at Haarlem. In 1484 he entered the Painters' Guild of Bruges, of which he became dean in 1501. Here he studied the works of the Van Eycks, Van der Weyden, Vander Goes and Hans Memling. He was soon recognized as the great master of Bruges, was awarded several important commissions by the city and became closely identified with the religious life of the city. Until recently he was a forgotten master, his importance being but little recognized until the comparative exhibition of Early Flemish masters at Bruges in 1902. In America he is represented in the Metropolitan Museum, New York, by ‹Christ's Farewell to the Holy Women› and in the New York Historical Society by ‹The Marriage of Saint Catharine› and in private collections. The National Gallery, London, contains an admirable example of his work in ‹A Canon and His Patron Saints,› a wing from an altar-piece; and among his other pictures are a ‹Madonna,› in the museum at Rome; a ‹Crucifixion,› in Berlin; and a ‹Baptism of Christ,› and a ‹Descent from the Cross,› both at Bruges. Consult Bodenhausen, ‹Gerard David und seine Schule› (Munich 1905). For his paintings in America see Bodenhausen and Valentiner, ‹Zeitschrift für bildende Kunst› (Vol. XXII, Leipzig 1911).

DAVID, Jacques Louis, French painter: b. Paris, 30 Aug. 1748; d. Brussels, 29 Dec. 1825. He studied under Vien and entered the schools of the Academy. After obtaining the grand prize in Paris he studied in Rome from 1775 to 1780, devoting himself particularly to historical painting. He visited Rome a second time in 1784 and finished his masterpiece, the ‹Oath of the Horatii,› which Louis XVI had commissioned him to design from a scene in the Horaces of Corneille. In the same year he painted his ‹Belisarius›; in 1787, the ‹Death of Socrates›; and in 1788, ‹Paris and Helen.› He finished, in 1789, a large painting representing Brutus condemning his sons to death. He also furnished the designs of the numerous monuments and republican festivals of that time. In 1792 he was chosen an elector in Paris; afterward a deputy in the National Convention; and during the Reign of Terror was one of the most zealous Jacobins and wholly devoted to Robespierre. He proposed to erect a colossal monument of the nation on the Pont-Neuf, from the materials of the king's statue. At the trial of Louis XVI he voted for his death. In 1799 he executed the ‹Rape of the Sabine Women,› from the exhibition of which he received, as it is said, 100,000 francs. In 1804 the emperor directed him to execute four pieces, among which the coronation of Napoleon was particularly distinguished. Among his finest works of this period were many representations of the emperor, particularly that in which Napoleon was presented on horseback, on Mount Saint Bernard, pointing out to his troops the path to glory. This is often engraved. While court painter to Napoleon he produced the colossal canvas, ‹The Coronation of Napoleon I› (now at Versailles); which has been regarded as the greatest historical painting of the 19th century. In 1814 David painted ‹Leonidas,› his last painting in Paris. After the second restoration of Louis XVIII he was included in the decree which banished all regicides from France. He then established himself at Brussels, where he died in exile. While at Brussels he painted some exceptional portraits, notably those of the Abbé Sieyés, ‹Three Ladies of Ghent,› and of the daughter of Joseph Bonaparte. The opinions of the merits of this artist are various, but the praise of correct delineation and happy coloring is universally conceded to him. He found in the history of his time, in the commotions of which he took an active part, the materials of his representations. Consult the monographs by Coupin (Paris 1827); Chesneau (ib. 1862); Delécluze (ib. 1855); Blanc (ib. 1860); De Villars (ib. 1850); Jules David (ib. 1880); Rosenthal (ib. 1905) and Saumier (ib. 1904). Consult also Muther, ‹History of Modern Painting› (Vol. II, London 1907) and Stranahan, ‹History of French Painting› (1899).

DAVID, Laurent Olivier, Canadian author: b. Sault au Recollet, Quebec, 24 March 1840. He was educated at the College of Sainte Thérèse, and was admitted to the bar in 1864. He assisted in founding the papers *Le Colonisateur, L'Opinion Publique* and *Le Bien Publique.* In the latter he attacked the Roman Catholic clergy for their interference in political matters. In 1886 he was elected to the provincial legislature from East Montreal, but declined renomination in 1890. He became city clerk of Montreal in 1892, and was called to the senate in 1903. He has written ‹Biographies et Portraits› (1876); ‹Les Héros de Chateauguay› (1883); ‹Les Patriotes de 1837–38› (1884); ‹Les Deux Papineau› (1896) and ‹Le Clergé Canadien: sa mission et son œuvre› (1896); ‹Laurier et son Temps› (1905); ‹Vingt Biographies› (1905); ‹Souvenirs et Biographies› (1910).

DAVID, Pierre Jean, French sculptor: b. Angers, 12 March 1789; d. Paris, 5 Jan. 1856. He is commonly called DAVID D'ANGERS. Against his father's wishes he came to Paris in 1808, and for a time had a hard struggle with poverty. In 1810 he entered the atelier of Rolland and was at the same time the pupil of J. L. David (q.v.). His bas-relief of Epaminondas having gained the first prize for sculpture in 1811, he was enabled to go to Rome to perfect himself in his art. In Rome he came under the influence of Canova. On his return to Paris he laid the foundation of his fame by a colossal statue of the great Condé in marble. In August 1826 he was nominated a member of the Academy of Fine Arts, and in December of the same year professor in the School of Painting and Sculpture. He executed busts of Goethe for Weimar, of Schelling for Munich, of Tieck for Dresden, of Rauch and Humboldt. In 1830 he fought in the ranks of the Republicans and soon after received the commission for his masterpiece — the sculptures of the Panthéon. In 1831 he began the magnificent sculptures of the Panthéon, his most important work, which he finished in 1837. He took part also in the revolution of 1848 and became a Member of the Constituent Assembly. He went into exile after the coup d'état of Napoleon III and spent some time in Greece, whence he returned, broken in health, soon after. He executed a great number of medallions, busts and statues of celebrated persons of all countries, among whom may be named Walter Scott, Canning, Washington, Lafayette, Guttenberg, Cuvier, Victor Hugo, Béranger, Paganini and Madame de Staël. David worked with great rapidity and ease, and his chief strength consisted in his facility of invention and execution, especially in large works. In works of smaller size his drawing and modeling are seen to be deficient in fineness and accuracy. Consult Brownell, 'History of French Art' (New York 1892) and Gonse, 'La Sculpture française depuis le XIV Siècle' (Paris 1895).

DAVID, dä-vēth', Colombia, town on the Isthmus of Panama near the west end, 200 miles southwest of Panama city in a fertile plain on the Rio David which enters the Pacific eight miles to the south. Stock-raising and the cultivation of tobacco are extensively engaged in; there is a considerable trade and some gold mining. Pop. 9,000.

DAVID AP GWILYM, dä'vēd ăp gwēl'ĭm, Welsh poet of the 14th century. There is a doubt about his dates, some authorities giving 1340–1400; others 1300–68. He had a good education and considerable knowledge of Italian and Latin. His tendency to keen satire was very unpleasant to his kinsmen and neighbors, and he was at one time forced to leave home on this account. To Morvydd, the lady whom he loved, he addressed nearly 150 poems; though she returned the poet's love she was forced into an uncongenial marriage with a wealthy man. David eloped with her, and the fine imposed on him by the husband was so heavy that he could not have paid it but for the assistance of the men of Glamorganshire. He is undoubtedly the greatest of mediæval Welsh poets, and has been compared to Shakespeare, Burns, Ovid and Petrarch. Most of his poems were written in the metre called *cywydd*, of seven-syllable lines rhyming in couplets. Over 250 of his poems were collected and published by Owen Jones (1789); and a translation published by Arthur James Johnes (1834). Others of his poems have been discovered in manuscript in the Mostyn Library and British Museum. Consult Stern, L. C., «Davydd ab Gwilym» (in 'Zeitschift für celtische Philologie,' Vol. VII, pp. 1–265, Halle 1910). See WELSH LITERATURE.

DAVID BALFOUR; Being Memoirs of His Adventures at Home and Abroad, a novel by Robert Louis Stevenson, published in 1893. A sequel to 'Kidnapped,' this novel opens with the attempt of David Balfour to effect the escape of his friend, Alan Stewart, from Scotland; and to aid Stewart's brother, unjustly imprisoned on a charge of murder. He falls in love with Catriona Drummond, is imprisoned, and after his release goes to Holland, where he lives with Catriona without marriage. Her father interfering, the two are separated; but by the intervention of Alan Stewart they meet again and are married. The novel is in the romantic vein, written with Stevenson's simplicity and clearness, and is artistic in construction. See KIDNAPPED.

DAVID CITY, Neb., the county-seat of Butler County, situated on the Union Pacific, the Burlington and Missouri, the Chicago and Northwestern railroads, and about 45 miles northwest of Lincoln and 90 miles west of Omaha. It is a trade centre for the populous agricultural region surrounding the city. The city contains a public library, park and Chautauqua grounds. The waterworks and electric-light plant are owned by the city. Pop. 3,000.

DAVID COPPERFIELD. This novel appeared in 20 monthly numbers, beginning in May 1849 and ending in November 1850. After finishing the novel, Dickens remarked that he liked it the best of all his books. His fondness for this child of his fancy, as he called it, was partly due to the fact that the novel was reminiscent of his own early life. Not autobiography exactly, the novel rather runs on correspondencies between the careers of Charles Dickens and David Copperfield. D. C. is C. D. reversed. 'David Copperfield' is the story of a young man, who by his industry and talents rises out of the lower middle class — the proletariat almost — into literary fame. He passes through a cruel and degraded childhood, being compelled at one time to earn his living by pasting labels on bottles in a wine-shop with urchins like Mick Walker and Mealy Potatoes, and in the occupation he nearly starves to death. He is befriended by his great-aunt, Betsy Trotwood, who puts him to school, where he displays unusual abilities; he studies law, learns stenography and becomes an expert reporter in the House of Commons; he writes books and thereby gains a name. Throughout his career he associates with all sorts and conditions of men, from gentlemen down to rascals, some of whom, like Uriah Heep, find their way into jails. He marries twice; the child wife Dora dies, and he becomes supremely happy in the union with the mature Agnes. Everywhere 'David Copperfield' is a skilful mixture of fact and fiction. Dickens drew upon himself and a score of others for personal traits out of which his imagination created characters, rare and new.

Quite apart from autobiography, many readers have regarded 'David Copperfield' as Dickens's best novel. «Dickens never stood,» says his biographer, «so high in reputation as at the completion of 'Copperfield.' The popularity it obtained at the outset increased to a degree not approached by any previous book except 'Pickwick.'» The novel was admired by Bulwer-Lytton and Thackeray, and praised by Matthew Arnold, who rarely condescended to notice fiction. «What treasures of gaiety, invention, life, are in that book! What alertness and resources! What a soul of good-nature and kindness governing the whole!» These were Arnold's words. In my opinion, 'David Copperfield' contains no character quite equal to Mr. Pickwick, Sam Weller or Dick Swiveller, nor does it display the grotesque fancy of 'Great Expectations,' or the wonderful intellectual grasp of 'Bleak House.' To know Dickens it is necessary to read all that he ever wrote. But as a work of art 'David Copperfield' is Dickens's masterpiece. It contains little or no melodrama, little or no exaggerated pathos; farce and caricature are held in restraint to the point where they become comedy; incident naturally rises out of character, and character naturally rises out of incident. The most remarkable creation, said to be a remote likeness of Dickens's own father, is Mr. Micawber, the happy impecunious gentleman, whose debts do not trouble him so long as he can keep out of jail; who always eats, drinks, orates and sleeps in perfect contentment, certain that something will turn up. He is not dazed by the prospect of emigrating to Australia, where something does actually turn up, and he finds ample scope for his rhetoric in a colonial newspaper.

It is a decided drop from Micawber to Copperfield. The story of his boyhood is excellent, but Copperfield really develops into a cad without the author's knowing it. Nor are Dora and Agnes girls who now greatly interest readers. But there is the eccentric Betsey Trotwood who treats Mr. Dick the lunatic as if he were sane and protects David against Mr. Murdstone. She is admirably conceived and developed. And there are Peggotty, nurse and servant, with cheeks and arms so red that the birds might peck them in preference to apples, and her brother the fisherman and Barkis who «was willin',» and finally won her. In depicting the Peggotty group of characters Dickens rendered the mingled humor and pathos and heroism of humble life in a surprising manner. And was there ever elsewhere an undertaker like Mr. Omer? Streaks of pain and crime run through the book, but scoundrels like Steerforth and Uriah Heep are somehow forgotten for the fun. 'David Copperfield,' it has been observed, «is the perfection of English mirth.»

WILBUR L. CROSS,
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DAVIDGE, William Pleater, American actor: b. London, England, 17 April 1814; d. Cheyenne, Wyo., 7 Aug. 1888. He made his first appearance on the stage at the Drury Lane Theatre in London; after acting in various places in England, came to the United States in 1850. He took the part of Sir Peter Teazle at the old Broadway Theatre in New York, supported Forrest, Fanny Davenport and other leading actors and took part in the Shakespearean revivals at the Winter Garden Theatre in 1867. In 1869–77 he was at Daly's Fifth Avenue Theatre; in 1879 he appeared as the original Dick Deadeye in 'Pinafore'; and in 1885 he became a member of the Madison Square Theatre Company. He played over 1,000 parts, among them Hardcastle in 'She Stoops to Conquer'; Croaker in 'Good Natured Man'; Caliban in 'The Tempest'; Nick Bottom in 'Midsummer Night's Dream'; and Old Gobbo in 'The Merchant of Venice.' He published a volume of reminiscences, 'Footlight Flashes' (New York 1866); 'The Drama Defended' (ib. 1859), etc.

DAVIDISTS, the name given to two distinct religious sects, namely, the followers of David of Dinant in the 13th century, and those of David George or Joris in the 16th. David of Dinant was a teacher in the University of Paris and contemporary of Almaricus of Bena (Amaury de Bène). At the death of Amaury (1204) he continued to teach Amaury's pantheistic doctrine, founded on Neoplatonism, that the «All is God.» David taught that holiness is simply the consciousness of the presence of God, the thought that God is the «One and the All»: that he who attains the perfect view of the God-All cannot sin, no matter what enormities he commits; he is the Christ, he is the Holy Ghost. The other sect of Davidists, called also David-Georgians, after the name of their founder, who was born at Delft in 1501, had its rise in 1534. Its founder published in 1542 his 'Book of Wonders,' recounting his marvelous visions and divine revelations. But he retired from the leadership in 1544, and during the remainder of his life was a prosperous merchant at Basel, under an assumed name. By order of the senate of Basel, his body, as that of a heretic, was exhumed and burnt. The sect, with Henry Nicolas as its head, made progress in Holland and got a footing in England, being now known as Familists. The Familists taught as their chief tenet the gospel of love, divine love. Love, they held, is above all laws, whether ceremonial, moral or civil, and the practice of the sectaries was so consonant with this doctrine that early in the 17th century the societies of Familists had to be suppressed in both countries, by the civil power.

DAVIDS, Thomas William Rhys, English Oriental scholar: b. Colchester, 12 May 1843. He was educated at the University of Breslau; from 1866 on filled judicial places in Ceylon and acted as archæological commissioner. In 1877 he was called to the English bar; was professor of Pali and Buddhist literature in University College, London (1882–1912); and professor of comparative religion, Manchester (1912–15). Among his works are 'Buddhism' (1877); translations of 'Buddhist Birth Stories' (1880); 'Buddhist Suttas' and 'Vinaya Texts' (1891); 'American Lectures' (1896); 'Sacred Books of the Buddhists; Dialogues of the Buddha' (1899); 'Buddhist India' (1902); 'Early Buddhism' (1910).

DAVID'S DEER (*Cervus davidianus*), a deer found in northern China and in Manchuria. It derives its name from Père David, a French Catholic missionary, who first saw it in the imperial park at Pekin. It resembles the Indian swamp-deer, but has long, shaggy hair and a long tail. It has no brow-tine. Little is known of its wild habits, for all of the representatives are found in parks in Europe, and it is likely soon to become extinct.

DAVIDS ISLAND, an island in Long Island Sound, near New Rochelle, N. Y., owned by the United States government and used for military purposes, especially as a training station for infantry recruits. It has an area of about 100 acres, and is fortified as Fort Slocum.

DAVIDSON, Andrew Bruce, Scottish biblical scholar: b. Aberdeenshire 1831; d. 1902.

He studied at Aberdeen, was ordained in 1863 and appointed professor of Oriental languages in New College, Edinburgh. He was generally regarded as the foremost British biblical critic of his day, and was a member of the Old Testament Revision Committee. Among his more famous pupils were George Adam Smith and W. Robertson Smith. Among his publications are 'Commentary on Job' (1862); 'An Introductory Hebrew Grammar' (9th ed., 1888); primers on 'Job,' 'Ezekiel,' 'Hebrews' (1877); 'The Called of God' (1903); and 'Waiting upon God' (1904), with biography by Taylor Innes.

DAVIDSON, Charles, American educator: b. Streetboro, Ohio, 29 July 1852. He was graduated at Iowa College in 1875 and studied subsequently at Yale. After several years of teaching in seminaries and academies he became assistant in English at Indiana University in 1893, and in the following year was associate professor of English at Western Reserve University, and from 1906 to 1911 was professor of education at the University of Maine. He is author of 'English Mystery Plays' (1892); 'Necessary Equipment for Teachers of English'; 'English a Factor in the Training of a Business Man'; 'A Guide to English Syntax'; 'English in the Secondary School'; 'Motor Work and Formal Studies in Primary Grades' (1911), and various monographs and numerous papers and articles on education and the teaching of English.

DAVIDSON, Sir Charles Peers, Canadian jurist: b. Huntingdon, P. Q., January 1841. He is a graduate of McGill University; was called to the bar in 1864; was returned for the Quebec provincial legislature, 1881, and sat in the Dominion House of Commons, 1882–87, when he was appointed a judge of the Supreme Court of Quebec. He was one of the commissioners appointed in 1891 to inquire into the Baie des Chaleurs Railway scandal, and in 1915 was charged with the investigation of alleged war contract irregularities. He was knighted in 1913.

DAVIDSON, George, American astronomer: b. Nottingham, England, 9 May 1825; d. 1911. He came to the United States in 1832; was graduated at the Central High School, Philadelphia, in 1845; and joined the United States Coast Survey. While in this service he was chief engineer of a party which surveyed a ship canal route across the Isthmus of Darien. He also made a geographical survey of the coast of Alaska in 1867. He traveled extensively in Egypt, China, India and Europe, for purposes of scientific study and also took charge of the telegraph-longitude work, and of the main triangulation and astronomical party carrying the geodetic work across the continent. From 1877–84 he was regent of the University of California, and for many years was president of the California Academy of Sciences. He retired from the coast survey after 50 years of distinguished service, in 1895, and became professor of geography in the University of California. He published 'The Alaska Boundary' (1903); 'The Glaciers of Alaska' (1904); 'The Discovery of San Francisco Bay' (1907); 'Francis Drake on the Northwest Coast of America' (1908); 'Origin and Meaning of the Name California' (1910).

DAVIDSON, James Wheeler, American capitalist: b. Austin, Minn., 14 June 1872. He was graduated from the Northwestern Military Academy, Highland Park, Ill., in 1891. He was a member of the Peary Artic Expedition to the North Polar regions, 1893–94; war correspondent with Chinese army, 1895; and with the Japanese army, 1895–96. In June 1897, he was appointed by President Cleveland consular agent for the island of Formosa, where he remained nine years, during which time he wrote numerous monographs on Formosan affairs, as well as a large volume entitled 'Formosa Past and Present' (1890), which is considered as a standard book of reference on this subject. In 1903 he obtained leave of absence, and under the auspices of the Russian Communications Department made a careful survey of the territory adjacent to the Asian section of the Trans-Siberian Railway, collecting material for a complete report of this territory, extracts from which appeared in the *Century Magazine* (April–June 1903). In 1904 he was appointed to Dalny, Manchuria, one of the political consulates, where he was expected to promote Secretary Hay's "open door" policy. Later he became consul at Antung, Manchuria, and commercial attaché to the American legation, Pekin, and special agent of the Department of State. He was appointed by President Roosevelt in 1905 consul-general at Shanghai. He was decorated by the Emperor of Japan in 1895 with Order of Rising Sun for services rendered Japanese army in capturing the capital of Formosa. He is a fellow of the Royal Geographical Society and member of the Asiatic Society, the Explorers' Club and the Authors' Club. He has large lumbering interests and in 1915 was president of eight banks in North Dakota. His publications include 'Formosa Camphor and Its Future' (1895); 'A Review of the History of Formosa' (1896); 'Formosa Under Japanese Rule' (1903), and contributions to the publications of scientific societies and magazines.

DAVIDSON, James Wood, American author: b. Newberry County, S. C., 9 March 1829; d. 1905. He was graduated from South Carolina College (now the State University) and taught Greek at the Mount Zion Collegiate Institute. During the Civil War he fought in the Confederate army as adjutant in Stonewall Jackson's army corps under Lee in Virginia. After the war he took up journalism, was literary editor of the New York *Evening Post*, 1873, and American correspondent of the London *Standard* from 1873 to 1878. After 1887 he was employed in the Treasury Department at Washington. He wrote 'The Living Writers of the South' (1869); 'A School History of South Carolina' (1869); 'The Correspondent' (1886); 'The Poetry of the Future' (1888); and 'The Florida of To-day' (1889).

DAVIDSON, John, Scottish poet, novelist and miscellaneous writer: b. Barrhead, Renfrewshire, 11 April 1857; d. 3 Aug. 1905. He was at first a teacher, but in 1890 adopted a literary career, writing for the *Speaker* and other journals. He has published 'Scaramouch in Naxos' (1889); 'Fleet Street Eclogues' (1893; 2d series, 1896); 'A Random Itinerary' (1894); 'Ballads and Songs' (1894); 'Plays' (1894); 'Earl Lavender' (1895); 'New Ballads' (1896); 'The Last Ballad and Other

Poems’ (1899); ‘The Testament of a Man Forbid’ (1901); ‘The Testament of an Empire Builder’ (1902); and the novels ‘Perfervid’ (1890); and ‘Baptist Lake’ (1894). In a fit of depression he committed suicide by drowning near Penzance, and, in accordance with his directions, his body, on being recovered, was buried at sea.

DAVIDSON, John Wynn, American soldier: b. Fairfax County, Va., 18 Aug. 1824; d. Saint Paul, Minn., 26 June 1881. He was a graduate from West Point in 1845; served during the Mexican War in the Army of the West, was then placed on frontier and garrison duty, and fought a battle against the Apache and Utah Indians at Cienguilla, N. Mex., in 1854, in which he lost three-fourths of his command. He served in the Federal army during the entire Civil War, and in 1866 became lieutenant-colonel and in 1879 colonel, in the United States cavalry. He was professor of military science at the Kansas Agricultural College, and commanded various posts in Idaho, Texas, Indian Territory and Montana.

DAVIDSON, Randall Thomas, archbishop of Canterbury: b. Edinburgh, 7 April 1848. He was graduated at Trinity College, Oxford; after holding important livings was appointed bishop of Rochester in 1891; bishop of Winchester, 1896; and succeeded Temple as primate of England in January 1903. He visited America in 1904. Published ‘Life of Archbishop Tait’ (1891); ‘The Christian Opportunity’ (1904); ‘Captains and Comrades of the Faith’ (1911).

DAVIDSON, Samuel, Irish biblical scholar: b. near Ballymena, Ireland, 1806; d. 1 April 1898. After entering the ministry of the Presbyterian Church, he became in 1835 professor of biblical criticism and literature in the Presbyterian Theological College in Belfast. He afterward joined the Congregationalists, and was appointed, in 1842, a professor in their college in Manchester, but resigned in 1857, owing to his advanced opinions. His works include ‘Sacred Hermeneutics’ (1843); translation of ‘Gieseler's Ecclesiastical History’ (1846); ‘The Ecclesiastical Polity of the New Testament’ (1848); ‘An Introduction to the New Testament’ (1848–51); ‘Biblical Criticism’ (1852); ‘Introduction to the Old Testament’ (1862); ‘On a Fresh Revision of the English Old Testament’ (1873); ‘The New Testament Translated from the Critical Text of Von Tischendorf’ (1875); ‘Canon of the Bible’ (1877); ‘Doctrine of Last Things Contained in the New Testament’ (1882). His autobiography was published in 1889.

DAVIDSON, Thomas, Scottish philosopher and writer: b. Aberdeenshire, 25 Oct. 1840; d. Montreal, 14 Sept. 1900. He came to the United States in 1867, and was subsequently professor of classics in the Saint Louis High School. In 1875 he settled in Cambridge, Mass. Later he traveled in Greece and Italy. Included in his publications are ‘A Short Account of the Niobe Group’ (1874); ‘The Place of Art in Education’ (1886); ‘Giordano Bruno’ (1886); a ‘Hand-Book to Dante’ (1887); ‘Prolegomena to Tennyson's “In Memoriam”’; ‘Aristotle and Ancient and Modern Educational Ideals’; ‘The Education of the Greek People and Its Influence on Civilization.’

DAVIDSON, William, American general: b. Lancaster County, Pa., 1746; d. Cowan's Ford, N. C., 1 Feb. 1781. He took up arms at the outbreak of the Revolution, was major of one of the first regiments raised in Carolina, was appointed brigadier after the battle of Camden, and in 1781 was dispatched by Greene to prevent Cornwallis from passing the Catawba at Cowan's Ford. With his death in the battle which, ensued, and with the dispersion of his troops, began the pursuit of Greene by Cornwallis.

DAVIDSON COLLEGE, an educational institution at Davidson, N. C.; founded in 1837, under the auspices of the Presbyterian Church, and is at present governed by a board of trustees appointed by the presbyteries of North Carolina, South Carolina, Georgia and Florida. No theological department, however, is maintained, and the degrees conferred are the academic ones in art and science. Its professors and instructors are about 15 in number; students, 353; volumes in the library, 25,000; value of property, about $360,000, and the endowment $250,000.

DAVIE, William Richardson, American soldier: b. England, 21 June 1756; d. Camden, S. C., 8 Nov. 1820. He was brought to North Carolina when a child, and was graduated at Princeton, N. J., in 1776. He entered the American army, and obtained a captaincy in Pulaski's Legion. He rose to be colonel and commissary, served throughout the war, and was a favorite officer under Sumter and Greene. He was a member of the convention to form the United States Constitution in 1787, and advocated its acceptance in the convention of North Carolina. Through his influence the University of North Carolina was established. He was elected governor of that State in 1799, but served only a few months, resigning to accept the position of member of the embassy to the French government which resulted in the convention of 30 Sept. 1800. A good biographical sketch is to be found in ‘The Library of American Biography’ (ed. by J. Sparks).

DAVIES, Arthur B., American landscape and figure painter: b. Utica, N. Y., 1862. He studied under Dwight Williams, and in the Chicago Art Institute and in New York. He began as an illustrator for *Saint Nicholas Magazine.* He is a representative of the Romantic school in painting. He is represented in the permanent collections of the Art Institute of Chicago and the Metropolitan Museum, New York. Among his important works are ‘Spring's Renewal’ (1901); ‘The Breath of Light’ (1901); ‘The Girdle of Ares’ (1908; now in the Metropolitan Museum, New York); ‘Visions of the Sea’ (1911); ‘The Hunter of the Starlands’; ‘Maya, Mirror of Illusions’ (Chicago Art Institute); ‘Children of Yester-year,’ and three other paintings in the Brooklyn Museum. He has of late shown pronounced Cubist tendencies in a series of paintings, of which the most important is ‘The Great Mother’ (1914).

DAVIES, Charles, American mathematician: b. Washington, Litchfield County, Conn., 22 Jan. 1798; d. Fishkill Landing, N. Y., 18 Sept. 1876. He was educated at the United States Military Academy and was appointed professor of mathematics there in 1828. He held the same post subsequently at Columbia College and in the University of New York. He published ‘Surveying’ (1832); an edition of Legendre's ‘Geometry’ (1828); ‘Trigonometry’ (1840); ‘Elements of Algebra’ (1844; latest ed., 1901); ‘Logic of Mathematics’ (1850); ‘Mathematical Dictionary and Cyclopædia of Mathematical Science,’ with W. G. Peck (1855), and other works and textbooks on arithmetic, mathematics, etc.

DAVIES, Henry Eugene, American soldier: b. New York 1836; d. 1894. He was educated at Harvard, Williams and Columbia. He was admitted to the bar of New York in 1857, and entering the United States volunteers as captain when the Civil War broke out, he became brigadier-general in 1863. Serving with Sheridan he was made major-general of volunteers 1865. He resigned in 1866, afterward practising law in New York. He published ‘General Sheridan’ in the ‘Great Commanders Series’ (1895).

DAVIES, John, English poet: b. Hereford about 1565; d. London 1618. He was famous as a writing master at Oxford, and writer of curious philosophical poems, epigrams, etc. He was the author of ‘Microcosmos’ (1603); ‘The Witte's Pilgrimage’; ‘The Scourge of Folly’; ‘Witte's Bedlam’ (1617), etc. Consult Grosart (ed.), ‘Complete Works’ (2 vols., Blackburn 1873).

DAVIES, Sir John, English poet and lawyer: b. Tisbury, Wiltshire, 1569; d. 8 Dec. 1626. He was educated at Westminster and Oxford. Called to the bar in 1595, he became solicitor-general for Ireland in 1603, and attorney-general in 1606, being knighted the next year. He was elected to the Irish Parliament in 1613, and became speaker of the Lower House. He was returned to the English Parliament in 1621, and appointed lord chief justice in 1626. He published two works connected with his Irish career, ‘A Discovery of the True Causes why Ireland was Never Subdued’ (1612), and ‘Reports of Cases Adjudged in the King's Courts in Ireland’ (1615). As a poet he was a reactionist from the love poetry of the earlier Elizabethan period, turning to moral themes. He wrote ‘Orchestra,’ a poem on dancing, in which he maintained that all motion is music; ‘Hymns to Astræa’ (1599), a series of acrostics; ‘Nosce Teipsum’ (1599), a poem on the immortality of the soul. Consult ‘Complete Works,’ with memoir by Grosart (3 vols., Blackburn 1869–76).

DAVIES, Sir Louis Henry, Canadian jurist: b. Charlottetown, Prince Edward Island, 4 May 1845. He was educated at Prince of Wales College in his native town, and was called to the bar of the Inner Temple, London, in 1866. Beginning practice in Charlottetown he rose rapidly, being solicitor-general 1869 and 1871–72, and premier and attorney-general of the island 1876–79. He entered the Dominion House of Commons in 1882, remaining a member till his appointment as a judge of the Supreme Court of Canada. He was created K. C. M. G in 1897, and was Minister of Marine and Fisheries 1896–1901. In 1897 he was a member of the joint high commission appointed for the settlement of outstanding differences with the United States.

DAVIES, Samuel, American clergyman: b. New Castle County, Del., 3 Nov. 1724; d. Princeton, N. J., 4 Feb. 1761. He was educated at the seminary of the Rev. Samuel Blair, Fogg's Manor, Pa., was ordained in 1747, and was at his request appointed to officiate at different places of worship in Hanover County, Va., where, the Episcopal Church being then the established church of Virginia, dissenters were obnoxious to the civil authorities. His labors were highly successful, and led to a controversy between him and Peyton Randolph, the king's attorney-general, as to whether the act of toleration which had been passed in England for the relief of Protestant dissenters extended also to Virginia. The ultimate decision of the question was in the affirmative. With Gilbert Tennent he visited England in 1753 to obtain funds for the College of New Jersey (now Princeton University). In a footnote to a sermon, preached in 1755, and dealing with the spirit aroused by the French and Indian War, he wrote: «As a remarkable instance, I may point out to the public that heroic youth, Colonel Washington, whom I cannot but hope Providence has hitherto preserved in so signal a manner for some important service to his country.» The first presbytery in Virginia was established through his exertions in 1755; and in 1758 he was chosen to succeed Jonathan Edwards as president of the College of New Jersey. A collection of his sermons was published after his death, in three volumes, and passed through several editions in Great Britain and America. Consult memoir by Barnes in the ‘Complete Works’ (New York 1851).

DAVIES, Thomas Frederick, American Protestant Episcopal bishop: b. Fairfield, Conn., 31 Aug. 1831; d. Detroit, Mich., 9 Nov. 1905. He was a graduate of Yale in 1853, and subsequently studied at the Berkely Divinity School, where he was for a time professor of Hebrew. He was ordained in 1857, and after being successively rector of Saint John's Church, Portsmouth, N. H., and Saint Peter's, Philadelphia, was consecrated bishop of Michigan in 1889.

DAVIES, Thomas Frederick, American Protestant Episcopal bishop: b. Philadelphia, 20 July 1872, the son of Thomas Frederick Davies, bishop of Michigan. He was graduated at Yale in 1894 and at the General Theological Seminary of New York in 1897. He was ordained a deacon in 1897; and priest in 1898 by the Protestant Episcopal Church. He was assistant minister at the Church of the Incarnation, New York 1897–1900; rector of Christ Church, Norwich, Conn., 1901–03; rector of All Saints', Worcester, Mass., 1903–11, and became bishop of western Massachusetts in 1911.

DAVIES, T. Witton, English Baptist theologian and Orientalist: b. Nantyglo, Monmouthshire, 1851. He was educated at University College, London, and studied also in Berlin, Leipzig and Strassburg. He was pastor of a church in Merthyr Tydfil in 1878–80, professor of classics, Hebrew and mathematics at Haverfordwest Baptist College 1880–91, principal of Midland Baptist College, Nottingham 1892–99, lecturer in Arabic and Syriac, University College, Nottingham 1897–99, and professor of Hebrew and Old Testament Literature in Bangor Baptist College 1899–1906, and since the latter year professor of Semitic languages. His publications include ‘Oriental Studies in Great

Britain' (1892); ‘Magic, Divination and Demonology among the Hebrews and their Neighbors' (1898); ‘The Scriptures of the Old Testament' (1900); ‘Heinrich Ewald, Orientalist and Theologian' (1905); commentaries on «Psalms,» «Ezra,» «Nehemiah» and «Esther,» in ‘The Century Bible' (1906–09); ‘The Survival of the Evangelical Faith' (1907); joint-author ‘Welsh Political and Educational Leaders' (1907); and ‘Wales To-day and To-morrow' (1907); ‘Literary and Human Factors in My Life' (1911); ‘Bel and the Dragon,' introduction and commentary in the ‘Oxford Apocrypha' (1913), and contributions to various biblical journals; ‘The Encyclopædia Biblica,' ‘Orientalische Studien,' etc.

DAVIESS, dā'vĭs, **Joseph Hamilton,** American lawyer: b. Belford County, Va., 4 March 1774; d. Tippecanoe, Ind., 7 Nov. 1811. He was famed for his eccentricities and was commonly known as «Jo» Daviess. He was appointed United States district attorney in Kentucky and in that capacity prosecuted Aaron Burr for treason. Jo Daviess County in Illinois was named in his honor. He was killed at the battle of Tippecanoe.

DÁVILA, dä'vē-lä, the name of several persons well known in the history of Spanish-America: 1. GIL GONZALES. (See CENTRAL AMERICA; FIRST SPANISH COLONIES). 2. JUAN, Spanish soldier: b. Granada, Nicaragua, 1530; served in Peru, and later under Coronado in Costa Rica, and wrote (1566) ‘Relación de la Provincia de Costa Rica,' a document of historical value. 3. COELLO Y PACHECO, governor and captain-general of Chile, 1667–70.

DAVILA, dä'vē-la, **Alonzo,** Spanish soldier: b. City of Mexico; d. there, 1566. He was supposed to be implicated in a plot to make Martin Cortes ruler of New Spain, and was executed on this account.

DAVILA, Enrico Caterino, Italian statesman and historian: b. near Padua, Italy, 30 Oct. 1576; d. near Verona, 8 Aug. 1631. His father, a Cypriote, who fled to Venice after the conquest of Cyprus by the Turks in 1561, introduced him to the French court, where he was made page; after this he entered the French service, in which he highly distinguished himself. He subsequently entered the Venetian service, gradually rose to the post of governor of Dalmatia, Friuli and the island of Candia, and was esteemed at Venice the first man in the republic after the doge. While governor of Crema he was murdered. He is principally celebrated for his ‘History of the Civil Wars of France, from 1559 to 1598' (‘Storia della Guerre Civili di Francia,' Venice 1630). This has been translated into several languages, and deserves a place near the works of Guicciardini and Machiavelli. His ‘Life' has been written by A. Zeno (Venice 1733); Ciscato (Vicenza 1885). Consult also President J. Adams, ‘Discourse on Davila' (1805).

DÁVILA, Pedrarias, Spanish governor of the Darien Colony, Castilla del Oro and Nicaragua: b. Segovia, Spain, about 1440; d. Leon, Nicaragua, July 1530. His name was originally Pedro Arias, but the form given above is better known in history. He was the brother of the Condé de Puñonrostro, and married the daughter of the Condesa de Moya, the friend of Isabella the Catholic; won distinction in the wars of Granada, and enjoyed the protection of Fonseca, bishop of Burgos, master of the affairs of the Spanish-American colonies during the reigns of Ferdinand and Isabella and Charles I. Fonseca made Dávila governor of Darien in 1514, and the governor promptly employed the adventurers who accompanied him in a number of expeditions, including that of Hernan Ponce and Bartolomé Hurtado (1516) to the coasts of the present republics of Nicaragua and Costa Rica. He established himself at Panama, and had at his command the famous soldiers Balboa, Hernandez de Córdoba, De Soto, Ojeda, Olid, Ponce and Francisco Pizarro. In 1526–27 he asserted that, as governor of Castilla del Oro, he ought to administer Nicaragua and Honduras as well. His claim to the former was recognized. Balboa suffered death in consequence of incurring his enmity. Pedrarias is cited most frequently as the type of the vigorous, but wholly unscrupulous official of the first period of Spanish colonization on the American mainland.

DÁVILA Y PADILLA, pä-thēl'yä, **Augustin,** Mexican historian: b. Mexico 1562; d. Santo Domingo 1604. He entered the order of Dominicans in 1578, taught philosophy and theology at the College of La Puebla and Mexico, becoming prior of his convent La Puebla, and procurer of his order at the courts of Madrid and Rome 1596. He became preacher for Philippe II 1588, and was consecrated as archbishop of Santo Domingo 1601. He burned several hundred copies of the Bible translated into Spanish and annotated by Protestants. He wrote ‘Historia de la provincia de Santiago de Mejico' (1596–1634); and ‘Varia historia de la Nueva España y Florida' (Valladolid 1634).

DA VINCI, Leonardo. See VINCI, LEONARDO DA.

DAVIS, Arthur Hoey, Australian literary man: b. Drayton, Queensland, Australia, 14 Nov. 1861. After spending six years in a somewhat venturesome life for a boy, from 1882 to 1888, on sheep and stock farms, he entered the office of the curator of Intestate Estates at Brisbane, and the following year he became clerk in the sheriff's office and under-sheriff in 1902, a position which he left the following year to found *Steel Rudd's Magazine,* a journal which was destined to exert a very considerable influence on contemporary Australian thought and literature. Davis, or «Steel Rudd,» the name by which he is universally known, may be said to have created an Australian literary school of his own and to have done more than any other modern Australian writer to bring his country before the eye of the public. He has encouraged the younger generation of Australian writers to renewed literary efforts, through the columns of his magazine which have been always invitingly open to them. As the chronicler of the lives of the people of the «back country» he became famous in Australia in 1906, and soon thereafter he acquired an international reputation, to such an extent, in fact that, as a critic complains, there seems to be only one name in modern Australian literature worth chronicling. His language is terse, vivid, picturesque, and his power of depicting the life he presents is noticeable in all he does. Among his works which have attracted attention at home and outside Australia are 'On Our Section' (1899); 'Our New Section' (1903); 'Dad in Politics' (1904–05); 'Sandy's Section.' Davis has been called the Mark Twain of Australia, and his "Dad," the father of the Rudd family, has been compared to the work of the great American humorist.

DAVIS, Arthur Powell, American civil engineer: b. Decatur, Ill., 9 Feb. 1861. He was graduated at the Emporia State Normal School and at Columbian University in 1888. He was topographer of the United States Geological Survey 1884–94, when he conducted surveys and explorations in Arizona, New Mexico and California. In 1895–97 he was hydrographer in charge of all government stream measurements, and in 1898–1901 was in charge of the hydrographic examination of the Nicaragua and Panama Canal routes. He is a chief engineer of the United States Reclamation Service since 1906 and in 1909 was consulting engineer of the Panama Canal. He has published 'Elevation and Stadia Tables' (1893); 'Progress of Stream Measurements' (1897); 'Irrigation near Phœnix, Arizona' (1897); 'Irrigation Investigation in Arizona' (1898); 'Hydrography of Nicaragua' (1899); 'Hydrography of the American Isthmus' (1902); 'Water Storage on Salt River, Arizona' (1903), also articles in magazines on irrigation, the Isthmian canals and other hydrographic subjects.

DAVIS, Bradley Moore, American botanist: b. Chicago, 19 Nov. 1871. He was graduated at Leland Stanford Junior University in 1892, and studied also at Harvard, Bonn and Naples. From 1895 to 1906 he was connected with the department of botany at Chicago University. He was assistant in botany in 1911–14 and professor of botany since 1914 at the University of Pennsylvania. He is joint author of 'The Principles of Botany' (1906); 'Laboratory and Field Manual of Botany' (1907), and many papers on plant cytology and plant genetics.

DAVIS, Charles Belmont, American author: b. Philadelphia, Pa., 24 Jan. 1866. He is a son of Rebecca Harding Davis and a brother of Richard Harding Davis (qq.v.); was educated at Lehigh University, and was United States consul at Florence, Italy, for some time. He has written 'The Borderland of Society' (1898); 'The Stage Door' (1908); 'The Lodger Overhead' (1909); 'Tales of the Town' (1911); 'In Another Moment' (1913); 'Nothing a Year' (1915).

DAVIS, Charles Harold, American artist: b. Amesbury, Mass., 7 Jan. 1856. He studied three years at the Art Music School of Boston and under Lefebvre and Boulanger at the Académie Julien, Paris. He lived in France from 1880 to 1890, and exhibited annually at the Salon. In 1906 he was elected to the National Academy of Design. He was awarded prizes and medals at every exposition since 1887. He paints chiefly evening effects and is remarkable for simplicity of execution. His more notable works are 'The Brook' (Philadelphia Academy); 'Late Afternoon' (Union League Club, New York); 'Evening' and 'August' (Metropolitan Museum, New York); 'Deepening Shadows' (Corcoran Gallery, Washington); 'Summer' (National Gallery, Washington); 'Close of Day' and 'Twilight' (Chicago Art Institute); 'Moonrise at Twilight' (Carnegie Institute, Pittsburgh); 'Landscape' (Boston Museum). He is also represented in the City Museum, Saint Louis; the Art Museum, Syracuse; the Wordsworth Athenæum, Hartford; the Art Museum, Worcester, Mass.; the Providence School of Design and the Art Museum, Minneapolis.

DAVIS, Charles Henry Stanley, American physician and Egyptologist: b. Goshen, Conn., 2 March 1840; d. Nov. 1917. He studied in New York and European hospitals and subsequently settled in Meriden, Conn., of which he was mayor 1877–88 and city treasurer 1897–99. He published 'History of Wallingford and Meriden' (1870); 'The Voice as a Musical Instrument' (1873); 'Classification, Education and Training of Feeble Minded, Imbecile and Idiotic Children' (1880); 'The Egyptian Book of the Dead' (edited 1897); 'History of Egypt in the Light of Modern Discoveries' (1896); 'Grammar of the Old Persian Language' (1878); 'How to Be Successful as a Physician' (1905); 'Grammar of the Modern Irish Language' (1909); 'Some of Life's Problems' (1914). He was editor of *Biblia,* a journal of Oriental archæology from 1887, and a member of many learned societies.

DAVIS, Cushman Kellogg, American legislator: b. Henderson, N. Y., 16 June 1838; d. Saint Paul, Minn., 27 Nov. 1900. He was graduated at the University of Michigan in 1857; was admitted to the bar, but enlisted in the Union army in 1861. He began the practice of law in Saint Paul in 1865; was chosen to the Minnesota legislature in 1867; became United States district attorney in 1868; governor of Minnesota in 1874; and United States senator in 1887, 1893 and 1899. He was a Republican and a member of the peace commission which negotiated the treaty between Spain and the United States in 1898. He was for several years chairman of the Senate Committee on Foreign Relations, and reported the resolution which practically declared war against Spain.

DAVIS, David, American jurist: b. Cecil County, Md., 9 March 1815; d. Bloomington, Ill., 26 June 1886. He was graduated at Kenyon College in 1832, and settled in Illinois as a lawyer in 1835. He was elected to the legislature in 1844 and served as a State circuit judge from 1848 to 1862. In the latter year he was appointed an associate justice of the Supreme Court of the United States. He voted in favor of the Legal Tender Act. He resigned in 1877 to enter the United States Senate, of which he became president pro tem. in 1881, and retired in 1883.

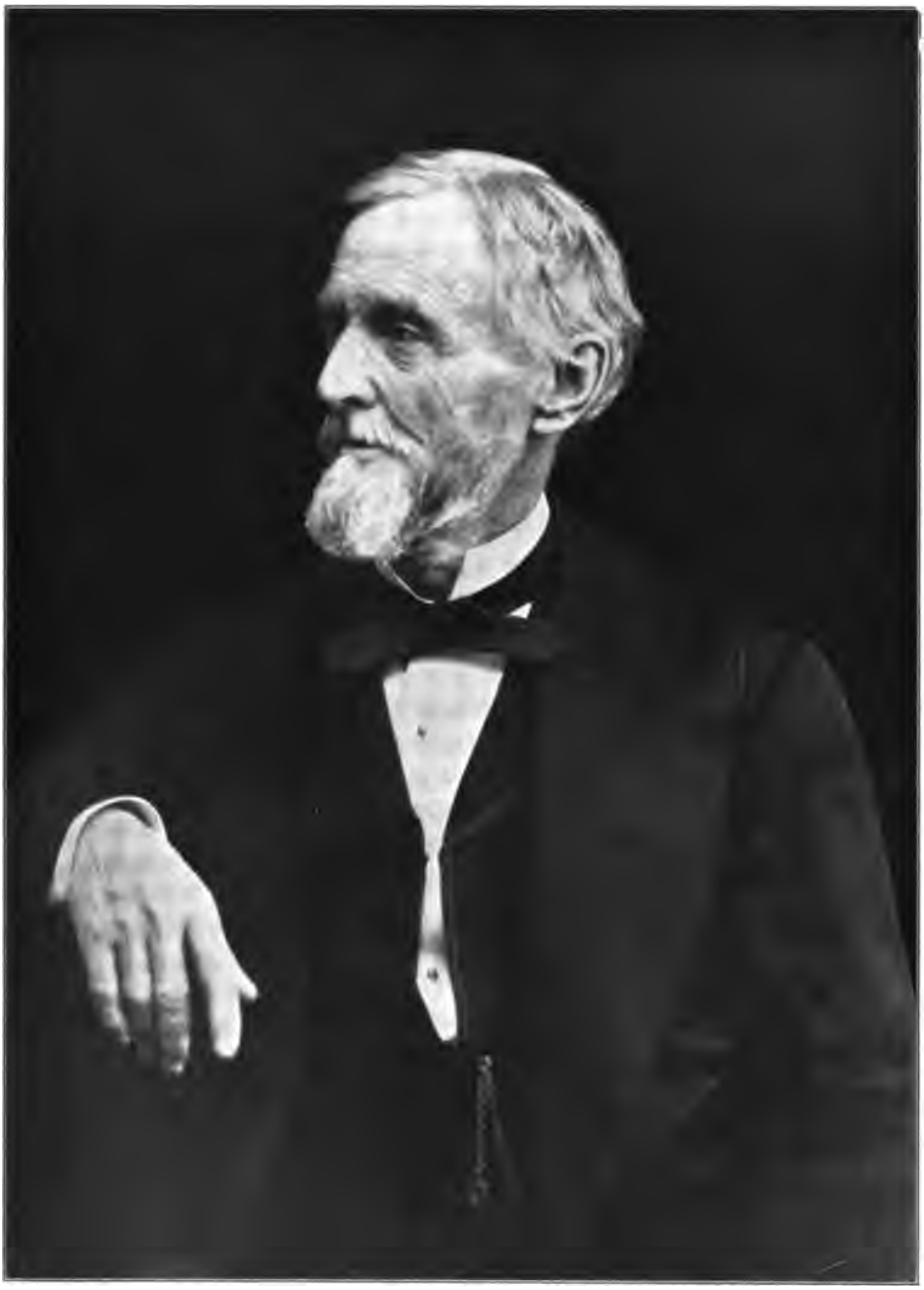
DAVIS, Edwin Hamilton, American archæologist: b. Ross County, Ohio, 22 Jan. 1811; d. New York, 15 May 1888. He was the author of 'Ancient Monuments of the Mississippi Valley' (1848), which was described by A. Morlot, the distinguished Swiss archæologist, as being "as glorious a monument of American science as Bunker Hill is of American bravery."

DAVIS, George Whitefield, American army officer: b. Thompson, Conn., 26 July 1839. He was educated at the New Britain State Normal School, and on the outbreak of the Civil War enlisted in the 11th Connecticut Infantry and by 1865 had attained the rank of major of volunteers. He was commissioned captain of the 14th United States Infantry in 1867 and retired as major-general in 1903. He was military governor of Porto Rico in 1899, and provost-marshal of the Philippines in 1901. He was appointed on the Isthmian Canal Commission in 1904 and was governor of the Canal Zone in 1904–05. He was special agent of the State Department to the government of Guatemala in 1913. He wrote the military history of the governments of Porto Rico and Manila and was president of the board of publication of the official records of the Civil War.

DAVIS, Henry Gassaway, American capitalist and legislator: b. Baltimore, Md., 16 Nov. 1823; d. Washington, D. C., 11 March 1916. He became superintendent of the plantation of ex-Gov. George Howard of Maryland, near Woodstock, Md., and subsequently was brakeman and conductor on the Baltimore and Ohio Railway, and agent at Piedmont, W. Va. Then he was active as a merchant and collier at Piedmont, and later carried to success the West Virginia Central and Pittsburgh Railway, by means of which he gave access to timber and coal lands of great value. The president of this road, he also became president of the Piedmont and Cumberland line. Sold these roads to the West Maryland Railroad in 1902; at once built coal and coke railway from Elkins to Charleston, W. Va., of which he became president; was also president of the Davis Colliery Company, Elkins National Bank and chairman of board, Davis Trust Company of W. Va. and personally managed these institutions at the age of 92 (1916). He was elected as a Democrat to the West Virginia house of delegates in 1865, was State senator in 1867–69, and having served two terms (1871–83) as United States senator, declined re-election. In July 1904 he was nominated by the Democratic party for the vice-presidency of the United States. He was a delegate to the Pan-American Congress, and became also a member of the Intercontinental Railway Commission. He was a power in the Democratic party in the State (as was his son-in-law, S. B. Elkins, in the Republican party). He gave from his great wealth to local charities and educational institutions.

DAVIS, Henry Winter, American statesman and orator: b. Annapolis, Md., 16 Aug. 1817; d. Baltimore, Md., 30 Dec. 1865. He was a member of Congress for three terms (1856–65), and took a leading part in advocating emancipation and loyalty to the Union. His published works are 'The War of Ormuzd and Ahriman in the 19th century' (1853); 'Speeches and Addresses in Congress' (1867).

DAVIS, Jefferson, American statesman: b. in Christian County, Ky., 3 June 1808; d. New Orleans, La., 6 Dec. 1889. A year or two after the birth of Davis the family removed to Wilkinson County, Miss., a new and prosperous cotton region. Young Davis was sent to various private schools in Mississippi and Kentucky before he became a student at Transylvania University in 1822. From Transylvania he went as a cadet to West Point in 1824, where Robert E. Lee, Albert Sidney Johnston and Joseph E. Johnston were his friends or classmates. After his graduation in 1828 Davis served seven years as an officer in the United States army along the Northwestern frontier, that is, in Iowa, Wisconsin and Minnesota. Col. Zachary Taylor was for a part of this period his commander. In 1835 he was married to Miss Taylor and the same year he resigned from the army and settled as a cotton planter in Warren County, Miss., where he quickly rose to the position of a wealthy and influential citizen and owner of slaves. An older brother, a leading public man of the State, contributed much to this easy success and was in considerable measure responsible for the entry of Jefferson Davis into politics, 1843, as a candidate for a seat in the House of Representatives. Meanwhile the first Mrs. Davis had died and he married Miss Varina Howell, a daughter of a well-to-do planter of the State. Hence the connections and social ties of the young political aspirant were such as to advance him rapidly. The issue which drew him into public affairs was the proposed repudiation of a great debt which the State of Mississippi had contracted with Nicholas Biddle, the Philadelphia capitalist. The older counties, those along the Mississippi River, were prevailingly Whig and opposed to repudiation on both moral and political grounds. Davis was a Democrat who broke with his party on the issue and offered himself as candidate for the legislature with the purpose of preventing the Democrats from carrying out their plans. Although he was defeated, he became an elector on the Polk ticket in 1844. As such he canvassed the State and became widely known as an effective speaker and ardent expansionist. The next year he was elected a member of Congress, but he resigned to take command of a regiment of Mississippi volunteers in 1846. He played a conspicuous part under Gen. Zachary Taylor at Monterey and Buena Vista, for which his name became familiar to the whole country. On his return from Mexico in 1847 he was appointed by the governor of Mississippi to a vacancy in the United States Senate. When the legislature met he was unanimously chosen for a full term. When he appeared in Congress he was promptly made chairman of the Senate Committee on Military Affairs and as such he labored constantly for a larger army and for the conquest and retention of that part of Mexico which borders on the Gulf of Mexico. To the disgust of Davis, John C. Calhoun lent his influence to the party of opposition and the extreme expansionists were defeated. Nevertheless Davis was an avowed follower of Calhoun and upon the death of the latter he became the accepted leader of the South in national affairs. In the critical struggle of 1850, when there was imminent danger of a disruption of the Union, Davis was an extremist who urged secession on the part of the South rather than submission to the compromise measure which allowed California to enter the Union as a free State. He demanded the extension of the Missouri Compromise line to the Pacific which would have made southern California a slave State and left New Mexico, Arizona and Utah open to slave colonization. Failing to secure the adoption of his plan, he signed, with most of the other Southern delegates in Congress, a protest against the compromise, resigned his seat in the Senate and went home to lead a party of protest there. As candidate for the governorship he waged a vigorous campaign, but was defeated by the Unionists on a margin of less than 1,000 votes. Davis was now a discredited politician, for not only Mississippi but every other Southern State, save South Carolina, repudiated the idea of secession. He retired to his plantation, but he soon began to take an active part in public discussions and when his friend, Franklin Pierce, was nominated for the presidency by the Democrats in 1852, he made an active canvass in his behalf both in Mississippi and Louisiana. After the election of Pierce, Davis was asked to become a member of the Cabinet. The offer was declined, but the President-elect prevailed on him finally to enter the Administration as Secretary of War. Although the avowed purpose of the Democrats was never to disturb the Compromise of 1850, Davis the bitterest opponent of that measure two years before was now one of the first advisers of the Administration. There was uneasiness in the country, but Davis had changed his mind. He never again urged the South to secede but insisted on fighting for the South and slavery within the Union. As Secretary of War Davis was a vigorous and resolute reorganizer. He undertook to reform and enlarge the Military Academy at West Point; he enlarged the army and tried to abolish the rule of seniority which he considered a handicap to any military organization; and he brought camels from Arabia to be used as carriers on the dusty plains of the Far West. But his greatest work was the survey of the Rocky Mountain region with a view to building a Pacific railroad. Five routes were surveyed and an elaborate report in 12 octavo volumes was laid before Congress at the end of his term. Engineers, geologists and botanists had contributed their work and the value of the great West was made plain to the country. He recommended the building of a road by the southernmost route, that is, from Memphis to southern California. The government should give public lands and bonds and aid in financing the scheme, the war powers of the President being called into use in support of these nationalist recommendations. Although nothing was done at that time, these surveys were the beginning of a new agitation for a railway to the Pacific. When Pierce's term closed, Davis returned to the Senate where he continued to represent and press Southern interests upon Congress and the country. The repeal of the Missouri Compromise in 1854, which he had favored, had set the sections to fighting each other as fiercely as before 1850. He now took the view that Kansas should be kept open to slavery and he saw in the Dred Scott decision of the Supreme Court full justification for his contention. The new President, Buchanan, was not in the beginning in sympathy with the extreme pro-slavery demand and he sent Robert J. Walker, whom Davis and most other leading Southerners distrusted, as governor to Kansas. When the Lecompton constitution was defeated in Kansas, Davis denounced Walker as a traitor to the South. Buchanan removed Walker in obedience to the entreaties of Davis and others. Stephen A. Douglas, the Northern leader of the Democratic party, denounced the President for his treatment of Walker and for his acceptance of the Lecompton constitution. Douglas immediately regained the popularity he had lost in 1854. The issue was joined and Davis became the irreconcilable opponent of Douglas and of his candidacy. The Senate was made the scene of their manœuvers. Douglas was "read" out of the party by Davis which only added to the followers of the former at the North. Davis procured the adoption of a series of resolutions in April which was made the platform of the reactionary or Southern element in the convention which was about to meet in Charleston. Davis gave instructions to the national committee while the convention was in session. Douglas directed the conduct of the majority of the delegates. The unyielding attitude of the two leaders caused the break-up of the convention and the nomination of two Democratic candidates, Breckinridge and Douglas. But when it became increasingly clear that Abraham Lincoln, the candidate of the Republicans, would be elected, Davis, who had remained in Washington all summer, endeavored, in September 1860, to bring about a reconciliation between the angry sections of the party. Unable to find a leader who could unite the followers of Douglas and Breckenridge, he gave up and let events take their own course. He was in Mississippi when the election of Lincoln was announced and his opinion was at once sought by secession and anti-secession men. He wrote *The Charleston Mercury* on 10 November that he was opposed to breaking up the Union and advised that Mississippi would probably not follow South Carolina. Later the governor of Mississippi called a conference of the State's delegation in Congress in which Davis again advised against secession. This led to a reaction against him and he was charged with being simply an ambitious candidate for the presidency of the United States. But the shaping of events had already passed beyond the control of the leaders. South Carolina was almost a unit in favor of immediate secession. The cause had long been a popular one in that State. And if South Carolina left the Union and should then be coerced by the Federal government nothing could prevent the secession of the other Southern States. South Carolina seceded. Davis, again in Washington, urged Buchanan to recognize the act as the right of any State. Buchanan refused to follow this advice and when Mississippi withdrew Davis gave up his place in the Senate with the greatest reluctance. He returned to Mississippi warning the people along the way that there would be a long and bitter struggle. In so far as he had any plans for the new régime, he wished to become the commander of an army in the field. But his election to the presidency of the Confederacy on 9 Feb. 1861 placed him at the head of the movement which he had, to be sure, favored in the beginning but which he had certainly not urged in recent years. He now endeavored to reconcile all elements of the South. The radicals he thought would be satisfied to remain in private stations or fight in the ranks. Conservatives who had opposed secession were placed in Cabinet positions. Charles G. Memminger of the Treasury, L. Pope Walker of the War Department and Robert E. Lee of the army were all of this group; and Alexander H. Stephens, the Vice-President, had always been opposed to secession and he was a personal opponent of Davis. This conciliatory program of Davis was adopted by the States when they chose opponents of the secession movement to seats in the Confederate Senate. Radicals like William L. Yancey and Robert Barnwell Rhett,



JEFFERSON DAVIS

who had fought for a Southern Confederacy for 20 years, scarcely obtained recognition—a policy which brought Davis many of his greatest problems as the war wore on. Seeking to enlist the conservatives of the South on his side, he also sought to conciliate the conservatives of the North and thus isolate the radical Republicans who urged the prompt coercion of the seceded States. To this end Davis labored consistently to prevent bloodshed at Charleston where a Southern army was gathering to compel the surrender of Fort Sumter. William H. Seward, the most influential man of the North before the inauguration of Lincoln, likewise endeavored to prevent an outbreak. The policy of conciliation was so publicly and openly cultivated that Southern leaders of the radical type insisted that there would be no war, that Davis and Seward had an understanding between them whereby the Union was to be restored. When, therefore, General Beauregard telegraphed from Charleston that Fort Sumter would be reprovisioned by order of the Federal government, Davis still hesitated and advised against attack if by delay any sort of assurance were given that the fort would be given up peacefully. When the order to begin firing was finally given it was done hurriedly by subalterns of General Beauregard who feared that otherwise there would be no war and a reconstruction of the Union would follow. But the firing on Major Anderson on the night of 12 April 1861 stirred the martial spirit of the whole South, as well as of the North, and the border States of Virginia, North Carolina, Tennessee and Arkansas joined the Confederacy. Davis became the President of all the seceded States and the capital was removed from Montgomery to Richmond. The constitution of the new group of commonwealths was in many respects the work of Davis and the moderate attitude of the Confederacy toward the foreign slave trade and the tariff was due to his influence. Although presidents of republics are not held rigidly to the strict letters of constitutions, Davis was most careful not to overstep the bounds set him save in the gravest emergencies. He set aside the writ of *habeas corpus* only in rare instances and then for limited districts and for limited periods. He allowed the greatest freedom of the press, even when most of the leading papers insisted upon denouncing him every day. I believe no newspaper office was closed by his order during the whole period of the war. One of the weaknesses of his administration was due to the fact that he was definitely elected in 1861 for a term of six years after the expiration of which he could not be a candidate for reelection. This gave the Confederate Congress a freer hand than any other American Congress has ever had. But an equally difficult problem for Davis consisted in choosing the commanders of the armies. The high officers who resigned from the Union army all expected higher commands from the Confederate government. Davis hoped to appoint men according to what he prematurely called a merit system; but they insisted each, save Lee, upon the old seniority rule of the Federal government. Dissatisfaction began when the first list of generals was sent in; it grew steadily to the end. Davis believed in the volunteer system for the beginning of the struggle; but in the winter of 1861–62 he became convinced that conscription alone would keep the army units full. Congress opposed him constantly on this issue. He believed the lines of State sovereignty should be partially obliterated during the war; but Congress and the legislatures of the States opposed him bitterly. He urged that appointments to all the responsible military positions should be made by the President upon recommendation of the army chiefs; but the governors of the States opposed and the judges of State courts intervened in military matters with contrary opinions and with *habeas corpus* proceedings. In spite of all these and other difficulties, he did create great armies and a considerable navy; he set up arsenals and built salt works, laid railroad tracks and encouraged all sorts of domestic manufactures. Zeal and energy characterized his administration from the start and the positive blunders of serious magnitude of which he was guilty were few. With a population of less than 7,000,000 white people, the Confederacy raised armies which numbered near a million men and it required the work of 2,000,000 soldiers and four years of time to suppress them. But the pressure of the blockade which President Lincoln increased with every month and the failure of every European power to recognize the Confederacy finally brought Davis and his generals to expect defeat. Moreover the railroads wore out; rolling stock failed and the plentiful supplies in the country districts could not be transported to the armies or the centres of population. Bread riots occurred in Richmond and the army of Lee while it guarded the lines about Petersburg had no meat and little bread. The people lost heart. Lee's army surrendered on the 9th of April 1865. Davis was already hastening south in flight. He was captured at Irwinsville, Ga., on the 10th of May following and he was promptly imprisoned at Fort Monroe. There he remained until 15 May 1867 when he was released on bail signed by Horace Greeley and other life-long opponents. Broken in body and fortune, he visited New Orleans, his former home near Vicksburg, England and France; but settled down to work as the president of a life insurance company in Memphis in 1870. The panic of 1873 caused the business to fail. He then endeavored to promote some large commercial enterprises in New Orleans but these never materialized and he took up his residence at Beauvoir in 1878, a pretty home on the Gulf coast which was presented to him by a friend, where he spent the remainder of his life. He died in New Orleans where he had gone on a business journey. His remains were buried there, but removed to Richmond in 1893.

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DAVIS, Jefferson Columbus, American military officer: b. Clark County, Ind., 2 March 1828; d. Chicago, 30 Nov. 1879. He left school for the Mexican War, in which he received a commission for gallantry. He was with the garrison at Fort Sumter, S. C., as first lieutenant when its bombardment began the Civil War. He received the brevet of major-general of volunteers and the full rank of colonel in the regular army for distinguished service on the Union side during the war. For some years after the war, he was stationed on the Pacific coast, where he suppressed the Modoc revolt in northern California; and was afterward the first United States army officer to hold command in Alaska, a new post, Port Davis, being named after him in 1900.

DAVIS, John, English navigator: b. Sandridge, near Dartmouth, Devonshire, about 1550; d. 30 Dec. 1605. In 1585 he was sent out with two vessels to find a northwest passage, when he discovered the strait which still bears his name. He afterward explored the coasts of Greenland and Iceland, proceeding as far as lat. 73° N. He made five voyages to the East Indies, on the last of which he was killed in an engagement with some Japanese pirates off the coast of Malacca. He wrote an account of his voyages and invented a quadrant.

DAVIS, John Chandler Bancroft, American lawyer and diplomatist: b. Worcester, Mass., 29 Dec. 1822; d. 1907. In 1849 he went to London as secretary of the United States legation; in 1854 became American correspondent of the London *Times,* and in 1869, 1871 and 1873–74 was Assistant Secretary of State. He represented the United States in the «Alabama» contest, zealously pushing the «indirect» claims; was Minister to Germany in 1874–77; and judge of the United States Court of Claims in 1878–82; and became reporter of the United States Supreme Court in 1883. He is the author of ‘The Massachusetts Justice’ (1847); ‘Mr. Sumner, the Alabama Claims, and their Settlement’ (1878); a work published in French entitled ‘Process Tribunals of the United States’ (1878); and many volumes of United States Supreme Court reports.

DAVIS, Katherine Bement, American sociologist: b. Buffalo, N. Y., 15 Jan. 1860. She was graduated at Vassar College in 1892 and studied also at Chicago, where she received the doctor's degree in political economy in 1900. Mt. Holyoke College conferred the degree of LL.D. on her in 1912 and Yale awarded her an M.A. in 1915. From 1892–97, she was head-worker at the College Settlement in Philadelphia. From 1901–14 she was superintendent of the New York State Reformatory for Girls at Bedford, and by her careful scientific methods of handling the inmates, made that institution a noteworthy experiment in penology. In 1914 she was appointed commissioner of correction for the city of New York by Mayor Mitchel. She was the first woman to hold such an office. In addition Miss Davis has been active in various philanthropic and civic organizations and is a well-known lecturer.

DAVIS, Noah Knowles, American philosophical writer: b. Philadelphia, Pa., 15 May 1830; d. Charlottesville, Va., 3 May 1910. He was educated at Mercer University, Ga., was professor of philosophy at the University of Virginia from 1873. Among his published writings are ‘The Theory of Thought’ (1880); ‘Elements of Deductive Logic’ (1890); ‘Elements of Psychology’ (1892); ‘Judah's Jewels; a study in the Hebrew Lyrics’ (1895); ‘Elements of Ethics’ (1900); ‘Synopsis of Events in Life of Jesus of Nazareth’ (1900); ‘The Nazarene’ (1901).

DAVIS, Oscar King, American journalist: b. Baldwinsville, N. Y., 13 Jan. 1866. He was graduated at Colgate University 1888, from which he received the honorary degree of Litt.D. in 1914. During the Spanish-American War and the Philippine insurrection, and in China during the Boxer Campaign he was special correspondent of the New York *Sun* and *Harper's Weekly* at Manila. He was special correspondent of the New York *Herald* with the First Japanese Army 1904. He was Washington correspondent of the New York *Times* and the Philadelphia *Public Ledger* 1907–12, and became secretary of the Progressive National Committee in 1912. He was special correspondent of the Chicago *Tribune* in the Far East 1915–16. He has published ‘Our Conquests in the Pacific’; ‘At the Emperor's Wish’; ‘Dewey's Capture of Manila’; ‘Sherreaf's Exclusive’ and other stories; ‘The Storm Birds’ (with Reginald Schroeder).

DAVIS, Rebecca Blaine Harding, American writer and novelist: b. Washington, Pa., 24 June 1831; d. 29 Sept. 1910. She contributed many short stories and sketches to periodicals, and also wrote several novels, including ‘Life in the Iron Mills’ (1861); ‘A Story of To-day’ (1861), published later under the title ‘Margaret Howth’; and ‘A Law Unto Herself’ (1878). She was the first writer in this country to introduce the labor question into fiction. Her later works include ‘Waiting for the Verdict’; ‘Dallas Galbraith’; ‘Natasqua’; ‘Frances Waldeaux’; ‘Doctor Warrick's Daughters’; ‘Silhouettes of American Life.’

DAVIS, Reuben, American lawyer: b. Tullahoma, Tenn., 18 Jan. 1913; d. Huntsville, Tenn., 14 Oct. 1890. He was educated in his native place, studied medicine and after a few years' practice abandoned that profession for the study of law. He removed to Aberdeen, Miss., and was prosecuting attorney for the sixth judicial district from 1835 to 1839. He was appointed judge of the High Court of Appeals in 1842, but resigned after four months' service. He served in the war with Mexico as colonel of the second regiment of Mississippi volunteers. He was a member of the State house of representatives from 1855 to 1857 and was elected to Congress from Mississippi, serving from 1857 to 1861, when he retired and entered the Confederate army as brigadier-general commanding a brigade of Mississippi militia in Kentucky. After the close of the Civil War he resumed his law practice. He published ‘Recollections of Mississippi’ (Boston 1889).

DAVIS, Richard Harding, American journalist and popular novelist: b. Philadelphia, Pa., 1864; d. Mount Kisco, N. Y., 11 April 1916. His mother was Rebecca Harding Davis. He was educated at Lehigh and at Johns Hopkins; became a reporter on the Philadelphia *Record* in 1887; and in 1888 went to New York where his striking stories of local life, first printed in the New York *Evening Sun*, brought him into prominence. For a short period he was managing editor of *Harper's Weekly* (1890). From that time on he roved wherever he pleased or where editors sent him. His first war correspondence came out of the conflict between Greece and Turkey. Later he "covered" all the important wars for various newspapers and magazines — the Spanish-American, South African and Russo-Japanese wars. In 1914 he was correspondent for the New York *Tribune* in Mexico during the seizure of Vera Cruz. In August 1914 Mr. Davis was captured by the Germans and narrowly escaped being shot for a spy. His last assignment was with the French and British armies in the retreat from Serbia, and the hardships of his correspondent's life is believed to have brought on the attack of angina pectoris which caused his death. A high type of fearless American journalism is exhibited in his travel sketches and war correspondence. While not deeply analytical, his stories and novels are full of action and the characters impress by independence and exuberant vitality. Among his books are 'Gallagher and Other Stories' (1891); 'Stories for Boys' (1891); 'Van Bibber and Others' (1892); 'Our English Cousins' (1894); 'About Paris' (1895); 'The Rulers of the Mediterranean' (1894); 'The Exiles' (1895); 'Three Gringos in Venezuela and Central America' (1896); 'Cuba in War Time' (1898); 'The Cuban and Porto Rican Campaign' (1898); 'With Both Armies in South Africa' (1900); 'The Princess Aline' (1896); 'The King's Jackal' (1899); 'Soldiers of Fortune' (1897), dramatized with great success in 1902; 'Captain Macklin: His Memoirs' (1902); 'The Bar Sinister' (1904); 'Kits and Outfits' (1905); 'Real Soldiers of Fortune' (1907); 'The Man Who Could Not Lose' (1911); 'The Lost Road' (1913); 'The Taming of Helen' (1903); 'Ranson's Folly' (1904); 'The Dictator' (1904); and the following plays 1903–13 'The Galloper'; 'Yankee Tourist'; 'Vera the Medium'; and 'Blackmail.'

DAVIS, Thomas Edward, American editor: b. Bedford, Va., 25 Sept. 1835; d. 20 Feb. 1917. He was graduated (1858) at the University of Virginia, studied medicine and law but did not practise; in May 1861 joined the Confederate Army, became adjutant of the 21st Virginia Cavalry and was promoted major and assistant adjutant-general. He fought in numerous engagements and at the close of the war removed to Montana and engaged in mining. He removed to Galveston, Tex., in 1871, where he was engaged in business for several years. He entered journalism in 1876 at Houston, founding the Houston *Telegram.* In 1879 he joined the staff of the New Orleans *Picayune,* of which journal he became editor in 1884, remaining in this relation till the sale and consolidation with the *Times-Democrat* in 1914.

DAVIS, Varina Anne Jefferson, American novelist: b. Richmond, Va., 27 June 1864; d. Narragansett Pier, R. I., 18 Sept. 1898. She was called "the Daughter of the Confederacy," her father being Jefferson Davis, the President of the Confederate States. Her education was obtained partly in the United States and partly in Germany and France, and she wrote 'The Veiled Doctor,' a novel, and 'A Romance of Summer Seas.'

DAVIS, Varina Howell Jefferson, American writer: b. Vicksburg, Miss., 7 May 1826; d. New York city, 16 Oct. 1906. She was the second wife of Jefferson Davis (q.v.). She was her husband's amanuensis when he wrote his 'Decline and Fall of the Confederate Government' and was the author of 'Jefferson Davis: a Memoir, by His Wife' (1890).

DAVIS, William Morris, American geologist and geographer: b. Philadelphia, Pa., 12 Feb. 1850. He was educated at Harvard University. He rendered valuable service as assistant astronomer in the Argentine National Observatory at Cordoba from 1870 to 1873. He taught astronomy and geology at Harvard from 1878; in 1890 became professor of physical geography there, and in 1899 was made Sturgis-Hooper professor of geology, continuing in this relation till 1912, when he became professor emeritus. He attained high rank in physiography by his lectures and writings on the development of the physical features of the earth and in 1911 was elected president of the Geological Society of America. He received numerous honorary degrees, became a member of many learned societies and scientific bodies, and was made a chevalier of the Legion of Honor in 1912. His many valuable treatises were published in the *American Journal of Science* and other periodicals. Besides these, his published works include 'Elementary Meteorology' (1894); 'Physical Geography' (1899); 'Whirlwinds, Cyclones and Tornadoes' (1884); 'Journey Across Turkestan' in Pompelly's 'Explorations in Turkestan' (1905).

DAVIS STRAIT, a strait on the west coast of Greenland, which connects Baffin Bay with the Atlantic Ocean. It was discovered in 1585 by John Davis (q.v.). It measures from 200 to 500 miles across. In 1888 the identity between Ginnunga Gap, referred to in the Sagas, and the present Davis Strait, was demonstrated. The northern half is navigable in late summer. Two powerful currents have been discovered, one on the west of drift ice toward the south and another on the east, flowing in a northerly direction.

DAVISON, Emily Wilding, militant suffragist. A lady of good Northumbrian family and a B.A. of London University, she had been imprisoned for "militancy" on several occasions and repeatedly resorted to the "hunger strike." On Derby Day, 3 June 1913, as the horses swept round Tattenham Corner at Epsom, she dashed out in front of them, bringing down Anmer, the King's horse, and its jockey to the ground, and herself sustaining grave injuries, to which she succumbed on 8 June. The passage of her remains through London on the way to interment at Marpeth was made the occasion of a great demonstration on the part of the "militants."

DAVIT. (1) A beam projecting from a ship's bow, for the attachment of the tackle whereby the anchor-fluke is lifted without dragging against the side of the vessel. The operation is nautically called "fishing the anchor." (2) One of a pair of cranes on the gunwale of a ship, from which are suspended the quarter or other boats. The boat-tackles are attached to rings in the bow and stern of the boat respectively and the fall is belayed on deck. When the boat is lowered the hooks of the fall-blocks are cast off simultaneously, or great danger results when the ship is under way.

DAVITT, Michael, Irish Nationalist politician and journalist: b. Straid, County Mayo, 25 March 1846; d. Dublin, 31 May 1906. His parents, peasant farmers, were evicted from their farm in 1851 and migrated to Lancashire, where at the age of 10 Michael began work in a cotton mill at Haslingden. Here in 1857 he lost his right arm by a machinery accident and secured employment in a printing office where he also managed to educate himself. He joined the Fenian brotherhood in 1867 and in 1870 was sentenced to 15 years' penal servitude for treason-felony in arranging for sending firearms into Ireland. He was released on a ticket of leave in 1877 and went on a lecture tour in the United States. Returning to Ireland he founded at his birthplace, 21 Oct. 1879, the Land League, which spread all over Ireland. He was again in America in 1880, organizing an American branch of the Land League, and on his return to Ireland was imprisoned under the Coercion Act. He was released in 1882. While in prison he had been chosen parliamentary representative for Meath, but being a convict was disqualified. He was one of the respondents before the Parnell Commission 1888–90, and conducted his own defense in a five-day speech. He became an Anti-Parnellite in 1890 and in 1892 was elected member of Parliament for North Meath, but was unseated on petition. He was next returned for Northeast Cork but had to vacate his seat through bankruptcy, caused by the costs in the North Meath petition. He was elected for West Mayo in 1895 but resigned in 1899.

He visited Australia in 1898 and on his return published the volume ‘Impressions of Australasian Democracy.’ He visited South Africa as war correspondent during the Boer War, investigated the Kishinev massacre and also traveled as correspondent of London journals in the Balkans and the Near East. In politics he was a sincere Nationalist, bitter in his attitude toward English methods and anti-clerical. In his later years his radicalism brought him into association with the Labor party. He contributed hundreds of articles to journals in Ireland, England and America and published ‘Leaves from a Prison Diary’ (1884); ‘Defense of the Land League’ (1891); ‘The Boer Fight for Freedom’ (1902); ‘Within the Pale’ (1903); ‘The Fall of Feudalism in Ireland’ (1904); ‘Pageant of London’ (1905). Consult Cashman, ‘Life of Michael Davitt’ (Boston 1881).

DAVOS, dä'vōs, a valley and district of Switzerland in the canton of Grisons, lying at a considerable elevation among the Alps and now a favorite place of residence both in summer and winter for people troubled with tuberculosis. The valley is about 10 miles long, shut in by mountains from 6,000 to 10,000 feet high and exhibiting many picturesque features. The chief centre of population is Davos-Platz, a place of 5,000 inhabitants, containing numerous hotels, boarding-houses and other establishments for visitors and having a handsome town-house and an English church. It is well sheltered on the north and east and the air is remarkably pure and dry. The Davos Landwasser traverses the district. This stream takes its rise in Lake Davos, which is one-fifth of a square mile in area and 175 miles deep. Consult Symonds, ‘Our Life in the Swiss Highlands’ (London 1892).

DAVOUT, dä'voo', **Louis Nicholas,** Duke of Auerstädt, Prince of Eckmühl and Marshal of France: b. Annoux, Yonne, 10 May 1770; d. Paris, 1 June 1823. He was educated at Brienne and entered the army as sub-lieutenant of cavalry in 1788. On the outbreak of the Revolution he embraced its principles. He was *chef de bataillon* in the campaign of 1792, was promoted general of brigade, but was removed because of his being of noble birth. He served on the Rhine in 1794–97, and accompanied Desaix to Egypt in 1798. His skilful handling of his troops at Aboukir came under the attention of Napoleon, and in 1800 he was made general of division and commanded the cavalry in the Marengo campaign. He was next appointed commander of the consular guard and marshal of France in 1804, soon after Napoleon became emperor. He distinguished himself in all of the succeeding campaigns as commander of the Third Army Corps. At Austerlitz his corps bore the brunt of the fighting, in the Jena campaign with a single corps Davout won the great victory of Auerstädt against the main Prussian army. His fame was enhanced at Eylau and Friedland. He was appointed governor-general of the grand-duchy of Warsaw after the Treaty of Tilsit in 1807, and in 1808 Napoleon made him Duke of Auerstädt. He again distinguished himself in the actions leading to the brilliant victory of Eckmühl, and also in the battle of Wagram. He was made Prince of Eckmühl in 1810. He helped organize the gigantic army which invaded Russia in 1812. In this campaign he won the victory of Mobiler and was wounded at Borodino. He was placed in command of the Hamburg military district in 1813, defended that city for several months, only surrendering on the direct order of Louis XVIII after the fall of Napoleon in 1814. His character and methods were often regarded as cruel and rapacious, but he doubtless acted on the instructions of Napoleon; being a rigid disciplinarian he gave the same precise obedience to superior orders which he exacted from his own subordinates. His military talents were of the highest, and later judgment has regarded him as perhaps the ablest of all Napoleon's marshals. Although at the first restoration he made his submission, he maintained his hostility to the Bourbons and during the Hundred Days acted as Minister of War, showing extraordinary ability in organizing troops and procuring army supplies. After Waterloo he directed the hopeless defense of Paris, and was deprived of his estates and titles after the restoration. He protested against the proscription of 1815 and when some of his subordinate generals were included, Davout demanded to be held responsible for their acts, as executed under his orders. He made every effort to prevent the condemnation and execution of the gallant Marshal Ney. His rank was restored to him in 1817 and he became a member of the Chamber of Peers in 1819. Consult Blocqueville, ‘Le maréchal Davout’ (Paris 1879–80); ‘Correspondance du maréchal Davout’ (ed. Mazade, 4 vols., Paris 1885); Chenier, ‘Davout, duc d'Auerstädt’ (ib. 1866); Montégut, ‘Le Maréchal Davout’ (ib. 1882); Holzhausen, ‘Davout in Hamburg’

(Mülheim-on-Ruhr 1892); Vigier, ‹Davout, Maréchal de l'Empire› (2 vols., Paris 1898).

DAVY, Sir Humphry, English chemist: b. Penzance, Cornwall, 17 Dec. 1778; d. Geneva, Switzerland, 29 May 1829. A taste for chemistry, which he displayed in some experiments on the air contained in sea-weed, attracted the attention of Mr. Gilbert, president of the Royal Society, and Dr. Beddoes, and the latter offered him the place of assistant in his laboratory. Here Davy discovered the respirability and exhilarating effect of nitrous oxide. He published the results of his experiments, under the title of ‹Researches, Chemical and Philosophical› (1799). This work immediately secured for him the place of professor of chemistry in the Royal Institution, at the age of 22. His lectures were attended by crowded and brilliant audiences, who were attracted by the novelty and variety of his experiments, the eloquence of his discourses and the clearness of his exposition. His discoveries with the galvanic battery, his decomposition of the earths and alkalis and ascertaining of their metallic bases, his demonstration of the true nature of oxymuriatic acid, his discovery of chlorine as an element, etc., obtained him a European reputation; and in 1808 he received the Napoleon prize of the French Institute. In 1812 he was knighted. In 1813 appeared his valuable ‹Elements of Agricultural Chemistry.› The numerous accidents arising from fire damp in mines led him to enter upon a series of experiments on the nature of this explosive gas, the result of which was the invention with which his name will always be associated, the safety-lamp (1815). In 1818 he was created a baronet. In 1820 he succeeded Sir J. Banks as president of the Royal Society. Cuvier said of him that, «in the opinion of all who could judge of such labours he held first rank among the chemists of this or any other age.» Near the close of his life he wrote his ‹Salmonia, or Days of Fly-fishing›; and his ‹Consolations in Travel, or the Last Days of a Philosopher.› Besides the works already mentioned, he also wrote ‹Elements of Chemical Philosophy› (1802); ‹Bakerian Lectures› (1807-11); ‹On the Safety-lamp› (1818), etc. A statue was erected to him at Penzance in 1872. Consult his ‹Memoirs,› edited by his brother, John Davy (2 vols., London 1836); his ‹Life› by Dr. Paris (1831); and ‹Fragmentary Remains› (London 1858).

DAVY, John, English composer: b. Upton-Helion, Exeter, 1765; d. London, 22 Feb. 1824. He was a teacher of music in London and wrote music for popular songs. His air, ‹The Bay of Biscay, Oh!› is famous.

DAVY JONES, a sailor's familiar name for a malignant sea-spirit or the devil generally. The common phrase «Davy Jones' locker» is applied to the ocean as the grave of men drowned at sea. A very dubious explanation of the name makes it compounded from Duffy, a West Indian negro spirit name, and the scriptural prophet Jonah, in jocular allusion to his somewhat unusual adventure.

DAVY LAMP, the safety-lamp of Sir Humphry Davy, in which a wire-gauze envelope covers the flame-chamber and prevents the passage of flame outward to the explosive atmosphere of the mine, while it allows circulation of air.

DAW. See Jackdaw.

DAWALLA (*Hypophthalmus dawalla*), a fish of the family *Siluridæ*, found in the rivers of Guiana, and highly esteemed for the delicacy of its flesh. It is sometimes two and a half feet long, and is brightly colored. The eye is situated below the angle of the mouth.

DAWANT, dä-vän, **Albert Pierre,** French historical painter: b. Paris, 21 Sept. 1852. He was a pupil of J. P. Laurens. He took a medal of the third class 1880, and second class 1885. Among his works are ‹St. Thomas à Becket› (1879); ‹Henry IV of Germany Before Pope Gregory VII› (1880); ‹Last Moments of Charles II of Spain› (1881); ‹Burial of an Invalide› (1882); ‹Salute to the Invalides› (1884); ‹St. John the Hospitaller› (1885); ‹Embarking of Emigrants›; and ‹The Rescue› (1889); ‹In Alsace› (1892); ‹Teaching the Children› (1888), in the Luxembourg Museum; ‹End of the Mass› (1890); ‹A Rehearsal› (1894); ‹Marshall Lannes at Convent of St. Pollen› (1895); ‹The Captive› (1896). He was made officer of the Legion of Honor in 1900. His later works include ‹Distress› and ‹Death: Sebastopol› (1904), and ‹Review at Bethany› (1905), in Versailles Gallery. He also illustrated the works of Victor Hugo, Alphonse Daudet and Alfred de Vigny. From 1908 he devoted himself chiefly to portraiture.

DAWES, Anna Laurens, American writer: b. North Adams, Mass., 14 May 1851. She is the daughter of H. L. Dawes (q.v.) and has been Washington correspondent of several New England papers, besides being prominent in various philanthropic and other organizations. She is the author of ‹How We are Governed› (1885); ‹The Modern Jew: His Present and Future› (1886); ‹Explanation of the Constitution and Government of the United States› (1895); ‹Charles Sumner› (1892).

DAWES, Henry Laurens, American legislator: b. Cummington, Mass., 30 Oct. 1816; d. Pittsfield, Mass., 5 Feb. 1903. He was graduated at Yale in 1839. Becoming a lawyer, he entered the State senate as a Republican and in 1857 was elected to Congress, serving in the House until 1873. He was elected to the United States Senate in 1875, and served until 1893. The condition of the Indian tribes especially claimed his attention, and after his retirement from Congress he was at the head of the Commission to the Five Civilized Tribes.

DAWES' HOLE, the astronomical name for the minute circular spots on the nucleus of a sun-spot, darker than the rest of the nucleus, and supposed to be the mouths of tubular orifices penetrating to unknown depths. They were first observed by the astronomer whose name they bear.

DAWK, or **DAK,** a term in India for postal traveling arrangements, by palanquins or other carriages, on the principal of the posting-horse station plans of pre-railway days in Europe and America.

DAWKINS, John. See Artful Dodger, The.

DAWKINS, William Boyd, English geologist: b. Buttington, near Welshpool, Montgomeryshire, 26 Dec. 1838. In 1861 he joined the Geological Survey, became curator of Manchester Museum in 1870, and professor of geology in Owens College there in 1872. The Channel Tunnel Committee employed him in 1882 to make a special survey of both coasts, and next year he laid down the line for a tunnel under the Humber. He delivered the Lowell Lectures in Boston in 1880. His chief works are ‘Cave-hunting: Researches on the Evidences of Caves Respecting the Early Inhabitants of Europe’ (1874); ‘Early Man in Britain, and His Place in the Tertiary Period’ (1880), the latter a work of great interest; ‘British Pleistocene Mammalia’ (1866–87).

DAWLEY, Thomas Robinson, Jr., Amercan journalist: b. New York, April 1862. He was educated in the Brooklyn schools, left home at 17, went to Liverpool on cattle ship, tramped from Liverpool to London; later engaged in the printing business in New York. He traveled in Central America, the West Indies, Spain and France; studied law at Providence, R. I.; went to Cuba for *Harper's Weekly* in 1896; visited insurgent camps and went out with Spanish troops. He was arrested several times, was confined two weeks in Morro Castle and expelled from the island by General Weyler. He returned to Cuba in the following year; visited the army of General Gomez; became volunteer aide on staff of General Miles in the Spanish-American War. After the taking of Santiago, he published the first American daily newspaper in Cuba, *The Times of Cuba*. The plant was seized by the Cuban authorities and he was obliged to return to the United States. He next went to Spain for the *Century* and was special commissioner for the *Outlook* at the Pan-American Congress in Mexico in 1901. He traveled through the Dominican Republic in 1904 and reported on political and sociological conditions there to President Roosevelt. He was special agent of the Bureau of Labor in 1907–09, and was assigned to investigate the effect of factory employment on the women and children drawn from the farms to the cotton mills of the South. He published several articles on Spain and Spanish-American countries to periodicals and the book ‘The Child that Toileth Not’ (1912).

DAWN, The. ‘The Dawn,’ or more correctly ‘The Dawns’ (‘Les Aubes’), is generally regarded as the greatest symbolistic drama of Emile Verhaeren. It differs from the plays of his Belgian countryman, Maeterlinck, in content, in that it concerns itself directly with social problems and the social revolution of the future, rather than with the psychic readjustments of the individual. ‘The Dawns’ here prophetically foreshadowed are the beginnings of justice between class and class, the triumph of great cities and the coming of peace through renunciation of victory by a people that has conquered its past and its traditional leaders. It announces that the time has come to found new religions and proclaim new doctrines. It differs from Maeterlinck also in construction and style; for whereas Maeterlinck allures with feminine charm and an insinuating grace, Verhaeren attacks his theme with abrupt vigor and irresistible *élan* that bursts into passages of magnificent poetry. He would compel rather than win his audience. Indeed, it is in these longer impassioned and flaring outbursts that the meaning of the play as well as its poetic value is to be sought. The drama proper is not well articulated, and into it are wound so many strands of meaning that at points it breaks down. For this reason, though published in 1898 it has been produced but once, and then privately, and in all probability will never prove successful on the stage. In the person of its tragic hero, the people's liberator, Hérénien, the suppressed impulses and hopes of the early 20th century came to triumphant expression, and his outbursts of eloquent aspiration contain many foreshadowings of the social and socialistic movements toward fraternization and an end of national conflicts which were to mark the progress of the World War of 1914. The play has been admirably translated into English by Arthur Symons.

CHRISTIAN GAUSS.

DAWSON, Coningsby (William), English author: b. High Wycombe, Buckinghamshire, England, 26 Feb. 1883. He was graduated at Merton College, Oxford, in 1905 and came to America in the same year. He did special work for English newspapers on Canadian affairs and in 1910 became literary advisor to the George H. Doran Publishing Company. He is joint editor, with his father, of ‘The Reader's Library,’ and has published ‘The Worker and Other Poems’ (1906); ‘The House of the Weeping Woman’ (1908); ‘Murder Point’ (1910); ‘The Road to Avalon’ (1911); ‘The Garden Without Walls’ (1913); ‘Florence on a Certain Night’ (1914); ‘The Raft’ (1914); ‘Slaves of Freedom’ (1916); ‘Out to Win’ (1918).

DAWSON, George Mercer, Canadian geologist: b. Pictou, Nova Scotia, 1 Aug. 1849; d. 1901. He was a son of Sir J. W. Dawson (q.v.) and was educated at McGill University and at the Royal School of Mines in London. In 1874 he was appointed assistant director and from 1895–1901 director of the Geological Survey of Canada. He was the author of ‘Geology and Resources of the Forty-ninth Parallel,’ and similar works.

DAWSON, Henry, English landscape painter; b. Hull, 3 April 1811; d. Chiswick, 13 Dec. 1878. In early life he was a worker in a Nottingham lace-factory, but this occupation he gave up for art in 1835. After struggling some time at Nottingham he removed to Liverpool in 1844, and thence to Croydon in 1850, and subsequently he resided at Chiswick. It was long before his abilities were fully recognized, and his pictures began to bring high prices only a little before his death. Among the best of them are ‘Wooden Walls of Old England’; ‘London from Greenwich Hill’; ‘Houses of Parliament’; ‘The Rainbow’; ‘Rainbow at Sea’; ‘The Pool Below London Bridge.’

DAWSON, Sir John William, Canadian geologist: b. Pictou, Nova Scotia, 13 Oct. 1820; d. Montreal, 19 Nov. 1899. He was educated at Edinburgh University, and early turned his attention to geology. He accompanied Sir Charles Lyell when examining the geology of Nova Scotia in 1842. In 1850 he became superintendent of education for Nova Scotia, and was in 1855 appointed principal and professor of natural history in McGill College, Montreal. He became a member of the Royal Society (London) in 1862, was knighted in 1885, and was president of the British Association in 1886 and president of the Geological Society of America (1893). His published works include 'Acadian Geology' (1855); Handbook of Canadian Zoölogy' (1871); 'The Story of Earth and Man' (1872); 'The Origin of the World' (1878); 'The Chain of Life in Geological Time' (1881); 'The Geological History of Plants' (1888); 'Modern Science in Bible Lands' (1888); 'Handbook of Canadian Geology' (1889); 'Modern Ideas of Evolution' (1890); 'The Ice Age in Canada' (1894).

DAWSON, Miles Menander, American actuary, insurance lawyer and author: b. Viroqua, Wis., 13 May 1863. He was educated at Kentucky (now Transylvania) University and the New York University Law School. He took up general practice as an insurance lawyer and consulting actuary. He was actuary of New York Legislative Life Insurance Investigating Committee, known as the Armstrong Committee, in 1905, of the Royal Commission on Life Insurance of Canada and the Wisconsin Legislative Insurance Investigating Committee 1906, and actuarial expert adviser of the New York Workmen's Compensation Commission in 1914; has made two study tours in Europe on Workmen's Compensation and Social Insurance, for Russell Sage Foundation in 1808 and for the United States Bureau of Labor in 1910; American secretary International Committee on Social Insurance; and treasurer of the Poetry Society of America. He has published 'Elements of Life Insurance' (1892; 3d ed., 1911); 'Assessment Life Insurance' (1895); 'Principles of Insurance Legislation' (1895); 'Practical Lessons in Actuarial Science' (1897, 2d ed., 1905); 'Things Agents Should Know' (1900); 'Various Derived Tables' (1900; 3d ed., 1915); 'Business of Life Insurance' (1905); 'Comparative Reserve Tables' (1905, 3d ed., 1915); 'Survivorship Annuity Tables' (1910–15); 'Working Men's Insurance in Europe' (joint author Lee K. Frankel, 1910); 'Elsie,' a novel from the Norwegian of Alexander Kjelland (1892); 'Poems of the New Time' (1901); 'Ethics of Confucius' (1915).

DAWSON, Samuel Edward: b. Halifax, 1 June 1833. He was educated at Montreal and engaged in business as a bookseller and publisher. He was king's printer of Canada, 1891–1909, and president of the Royal Society of Canada, 1907. He is the author of 'The Saint Lawrence Basin and its Border Lands'; 'A Plea for Literature' (1908).

DAWSON, William, English clergyman: b. Garforth, Yorkshire, 30 March 1773; d. Colne, 5 June 1841. He became a local preacher of the Wesleyan Methodist Church. He went all over England preaching with great power, often to immense audiences in the open air. By many he was considered the most eminent and able lay preacher produced by the Wesleyan movement. His life was written and his letters edited by James Everett. His sermons were posthumously published.

DAWSON, William Harbutt, English publicist b. Skipton, 27 July 1860. He was educated at Skipton School and Berlin University. He married a German lady. He has been actively engaged in social work; most of his books have been written for the purpose of interpreting German thought, life and character to English people, and particularly of expounding German practice in the treatment of social, economic and industrial questions. His publications include 'Evolution of Modern Germany' (1908); 'German Socialism and Ferdinand Lassalle' (1888); 'Prince Bismarck and State Socialism' (1890); 'Germany and the Germans' (1894); 'Social Switzerland' (1897); 'German Life in Town and Country' (1901); 'Matthew Arnold and his Relation to the Thought of his Time (1903); 'Protection in Germany: a History' (1904); 'The German Workman: A Study in National Efficiency' (1906); 'School Doctors in Germany' (1906); 'The Vagrancy Problem' (1910); 'Social Insurance in Germany' (1883, 1911–12); 'Industrial Germany' (1913); 'Municipal Life and Government in Germany' (1914); 'What is Wrong with Germany?', the causes of the War (1915); 'Introductions to Treitschke's German History' (1915), and contributions to the *Fortnightly Review*, the *Nineteenth Century* and the *Economic Journal*.

DAWSON, William James, English poet, novelist and clergyman: b. Towcester, Northamptonshire, 21 Nov. 1854. He entered the Wesleyan ministry in 1875 and is at present pastor of the old First Presbyterian Church, Newark, N. J. His works include 'A Vision of Souls' (1884); 'Quest and Vision: Essays on Life and Literature' (1886); 'The Makers of Modern Poetry' (1890); 'Poems and Lyrics' (1893); 'London Idylls' (1895); 'The House of Dreams' (1897); 'Through Lattice Windows' (1897); 'Table Talk With Young Men' (1898); 'Makers of Modern Prose' (1899); 'The Man Christ Jesus' (1901); 'The Quest of the Simple Life' (1903); 'The Book of Courage' (1911); 'Robert Shenstone' (1917).

DAWSON, Canada, city and capital of Yukon Territory, Northwest Territories. It is situated at an elevation of 1,400 feet on the right bank of the Yukon River, 1,500 miles from its mouth, at the confluence of the Klondike River, about 50 miles east of the Alaskan boundary; in lat. 64° 5′ N. and long. 139° 30′ W. The city, which is near the site of old Fort Reliance, has grown up since the discovery of gold on Bonanza Creek, 16 Aug. 1896, and is the receiving and distributing centre for the Klondike mining district. It is mostly well built, the two great fires of 1899 having destroyed many of the rude, temporary structures. Forty below zero is the average temperature for days at a time, but blizzards are not common. Thawing the ground by steam, the use of automatic lifts and buckets, and of machinery in general, have largely increased the gold output of the region. Coal deposits have been found nearby. Steamers ply upon both the upper and lower Yukon in the season of navigation from 1 June until October. Dawson has a United States consulate. Pop. 3,013.

DAWSON, Ga., city and county-seat of Terrell County, on the Central of Georgia and the Seaboard Air Line railroads, 95 miles southwest of Macon. It has oil, lumber and grist mills and is the centre of a cotton and fruit-growing district. It contains a Carnegie library. It was settled in 1855 and incorporated the following year. It is governed by a mayor, elected biennially, and a board of aldermen under a charter of 1891. It owns the water plant and electric-lighting system. Pop. 3,827.

DAX, däks, a town in department of Landes, southwestern France, on the left bank of the Adour 32 miles northeast of Bayonne by rail. It consists of the town proper, surrounded by old ramparts partly Roman, and of a suburb called Sablar, on the opposite side of the river and communicating with it by a bridge. The principal edifices are the high church, once a cathedral, the bishop's palace, now occupied as public offices, the communal college, and a handsome thermal establishment. There are various ancient Roman remains. Its chief attraction is its warm sulphur springs, which have temperatures varying from 86° to 166° F., were much frequented by the Romans, and are still in great repute. Its old name was Aquæ Tarbellicæ. Pop. 11,387.

DAY, Arthur Louis, American physicist: b. Brookfield, Mass., 30 Oct. 1869. He was graduated at Yale in 1892, and was instructor in physics there in 1894–97. He was a member of the scientific staff of the Physikalisch-Technische Reichsanstalt at Charlottenburg, Germany, 1897–1900, and physical geologist of the United States Geological Survey 1900–06, and in the latter year was appointed director of the geophysical laboratory of the Carnegie Institution at Washington. He is member of several learned societies, and has written many papers upon physical and geophysical investigations at high temperatures in German and American scientific journals.

DAY, Benjamin Franklin, American naval officer: b. Plymouth, Ohio, 16 Jan. 1841. He was graduated at the United States Naval Academy in 1862. During the Civil War he served with the West Gulf (1862–64) and North Atlantic (1864–65) blockading squadrons, and attained the rank of lieutenant-commander in 1866. In 1876 he became commander, in 1891 captain, in 1899 rear-admiral, and was retired from the service in 1900. From 1897 to 1900 he was a member of the Naval Examining and Retiring boards.

DAY, George Edward, American theologian: b. Pittsfield, Mass., 1816; d. New Haven, Conn., 2 July 1905. He was graduated at Yale in 1833 and in 1838 at the Yale Divinity School, where he became assistant instructor in sacred literature. From 1840 to 1851 he was pastor of churches in Marlboro and Northampton, Mass.; from 1851 to 1866 he occupied the chair of biblical literature in Lane Theological Seminary; and then that of Hebrew and biblical theology in Yale Divinity School, where he founded in 1891 the Historical Library of Foreign Missions. From 1863 to 1871 he was editor of the *Theological Eclectic* (afterward merged in the *Bibliotheca Sacra*) and, besides contributions to periodicals, published a translation of the 'Theology of the New Testament' of Van Oosterzee (1871); an American edition (1883) of Oehler's 'Theology of the Old Testament'; and other works.

DAY, Holman Francis, American journalist and author: b. Vassalboro, Me., 6 Nov. 1865. He was graduated at Colby College in 1887 and entering journalism the year after, has since been editorially connected with various Maine journals. He has contributed extensively to periodicals and is the author of three volumes of popular verse, 'Up in Maine' (1900); 'Pine Tree Ballads' (1902); 'Kin o' Ktaadn' (1904); also of novels, 'Squire Phin' (1905), dramatized as 'The Circus Man,' produced Chicago (1909); 'The Rainy Day Railroad War' (1906); 'The Eagle Badge' (1907); 'King Spruce' (1908); 'The Ramrodders' (1909); 'The Skipper and the Skipped' (1911); 'The Red Lane' (1912); 'The Landloper' (1915); 'Blow the Man Down' (1916); 'Along Came Ruth,' a play, produced (1914) by Henry W. Savage.

DAY, James Roscoe, American educator: b. Whitneyville, Me., 1845. He studied at Bowdoin and was ordained a minister of the Methodist Episcopal Church in 1872. He was pastor at Bath, Me., 1872–74; Portland, Me., 1876–78; Boston, 1881–82, New York, 1883–85 and 1889–93. In 1893 he became chancellor of Syracuse University. He was elected bishop in 1904, but resigned to continue in present position. He has written many magazine articles and sermons and has published in book form 'The Raid on Prosperity' (1907).

DAY, Jeremiah, American educator: b. New Preston, Conn., 3 Aug. 1773; d. New Haven, Conn., 22 Aug. 1867. He was graduated at Yale 1795. Having early made choice of the profession of theology, while acting as tutor he began to preach as a candidate for the ministry; but before taking charge of any parish was in 1801 elected to the professorship of mathematics in Yale College. In 1817 he became president of the college, continuing in that position till his resignation in 1846. He published 'An Introduction to Algebra' (1814); 'Navigation and Surveying' (1817); and other works.

DAY, John, English dramatist: fl. about 1600. Of his life hardly anything is known. He is mentioned in Henslowe's 'Diary' in 1598 as an active playwright. But few of his earlier works have come down to us save 'The Blind Beggar of Bethnal Green.' Day collaborated freely with contemporary writers, as Chettle and Dekker. Ben Jonson in his conversations with Drummond of Hawthornden grouped him with some other admirable gentlemen and authors as a rogue and a base fellow. His best works that have reached us are a graceful comedy, 'Humor out of Breath'; and 'The Parliament of Bees,' a kind of allegorical masque in which all the characters are bees. "The very air," says Charles Lamb, "seems replete with humming and buzzing melodies. Surely bees were never so be-rhymed before." An edition of Day's works was privately printed by A. H. Bullen in 1881. Consult Swinburne's essay in *Nineteenth Century* (October 1897); and 'Cambridge History of English Literature' (Cambridge and New York, 1907–13).

DAY, Richard Edwin, American author and editor: b. West Granby, Oswego County, N. Y., 27 April 1852. He was graduated at Syracuse University 1877, engaged in teaching, then journalism, being associate editor of the Syracuse *Standard* for 18 years. Since 1899 he has edited State publications at Albany,

N. Y., since 1904 in the State historian's office. He has published 'Lines in the Sand' (1878); 'Thor: a Drama' (1880); 'Lyrics and Satires' (1883); 'Poems' (1888); 'New Poems' (1909); Catalogue of Sir William Johnson Manuscripts in New York State Library' (1909).

DAY, or DAYE, Stephen, American colonial printer: b. London about 1610; d. Cambridge, Mass., 22 Dec. 1668. He was employed by the Rev. Joseph Glover to accompany him to America in 1638, to operate a printing press which he was going to set up in Massachusetts. Mr. Glover died on the voyagé and the press was placed in the house of Rev. Henry Dunster, first president of Harvard College. The first book printed in the colonies was issued from it in 1640, and was entitled 'The Whole Booke of Psalmes, faithfully translated into English metre,' commonly styled 'The Bay Psalm Book.' The printing house was taken from him about 1648, and put into the hands of Samuel Green. Consult Thomas, 'History of Printing in America' (1810).

DAY, Thomas, English writer: b. London, 22 June 1748; d. 28 Sept. 1789. He was educated at Oxford, and was called to the bar but never practised. He published several works in favor of the American Revolution and against slavery. His principles led him to renounce most of the indulgences of a man of fortune that he might bestow his superfluities upon those who wanted necessaries. He wrote, in prose and verse, on various subjects, but his name is kept alive chiefly by the well-known book written for the young, entitled 'History of Sanford and Merton.' His 'Poems' were published in 'British Poets' (Vol. LVIII). His 'Life' was written by Keir (London 1791) and by Blackman (ib. 1862).

DAY, William Rufus, American jurist: b. Ravenna, Ohio, 17 April 1849. He was graduated from the University of Michigan in 1870, and from the law school of the same institution in 1872. In the latter year he was admitted to the Ohio bar, and began the practice of law at Canton where he soon gained local and State distinction; in 1886 he was elected judge of the Common Pleas Court of the ninth judicial district, being the candidate of both political parties. In 1889, President Harrison appointed him United States district judge for the northern district of Ohio, but he was obliged to decline the appointment on account of ill health. In 1897 he was made Assistant Secretary of State by his friend, President McKinley, and in April 1898 he succeeded Sherman as Secretary of State, as such conducting all the negotiations of the Spanish War. Later in 1898 he resigned the secretaryship, and was appointed chairman of the United States Peace Commission to frame a treaty of peace with Spain, in which capacity he had a conspicuous and responsible part in all peace negotiations. He then returned to his law practice, but in 1899 was appointed to succeed Judge Taft as United States circuit judge, and on 26 Jan. 1903 was appointed to the Supreme Court by President Roosevelt.

DAY, a word used with several different senses. Its most ancient meaning is the period of light («natural day») as opposed to the period of darkness, and in this sense it is still quite commonly used. Its most common application, however, is to the period of light and that of darkness together, but even in this sense there are different days. The sidereal day is the time that elapses between two successive culminations (see CULMINATION) of any particular fixed star, or, in other words, is the time occupied by a revolution of the earth round its axis. The solar, astronomical or apparent day is the time that elapses between two successive returns of the same terrestrial meridian to the centre of the sun. This period is not always of the same length, and its mean length gives us the mean solar or civil day. The 24 hours of the sidereal day are numbered in succession from 1 to 24, while the civil day in most countries is divided into two portions of 12 hours each. The abbreviations P.M. and A.M. (the first signifying *post meridiem,* Latin for afternoon; the latter *ante meridiem,* forenoon) are requisite, in consequence of our division of the day into two periods of 12 hours each. In this respect the mode of numbering the hours from 1 to 24 consecutively has an advantage, and in some countries is being introduced; in parts of Italy it has long prevailed. The Babylonians began the day at sunrise; the Jews and Greeks at sunset; the Egyptians and Romans at midnight, as do most modern peoples. Astronomers use a day of the same length as the civil, but commonly make it begin at noon and number the hours up to 24, though latterly midnight has been partly adopted as the starting point.

If we take a day according to the second definition given above (that is, a sidereal day), its length, of course, is the same throughout the year (see SIDEREAL TIME). The solar day, in consequence of the varying rapidity of the earth in its orbit, and the obliquity of the ecliptic, is different at different times (see SOLAR TIME), and this difference is uniform throughout the earth; but the time of the natural day (or period of light) is different at the different points of the earth, according to their distance from the equator. To get a fixed measure of solar time astronomers imagine a sun moving uniformly in the celestial equator and completing its circuit in the same time as the real sun. The time marked by this imaginary sun is called mean solar time; when the imaginary sun is on the meridian it is mean noon; when the real sun is on the meridian it is apparent noon. Four times a year these two kinds of solar time coincide. In the intervals the sun is always either too fast or too slow, and the difference is called the equation of time. The daily apparent revolution of the sun takes place in circles parallel to the equator. If the equator and the ecliptic coincided the circle bounding light and darkness would always divide, not merely the equator, but all its parallels, into two equal parts, and the days and nights would be equal in all the parallels through the year; but at the poles there would be no night. Owing to the inclination of the earth's axis to the plane of its orbit (the ecliptic), the parallel of latitude in which the sun appears to move is continually changing; and therefore the equator alone (being a great circle) always remains bisected by the circle dividing light from darkness; so that the days and nights here are always equal; while the parallels of latitude, not being great circles, are not equally divided by the circle separating light from darkness, except at the time of the equinox, when the sun is moving in the equator; and, of course, at this time only are days and nights equal in those parallels. As you approach the poles the inequality between the days and nights becomes continually greater, till, at the poles themselves, a day of six months alternates with a night of equal duration. The most distant parallel circles which the sun describes north and south from the equator are, as is well known, only 21½ degrees from it. The distance between the polar circles and the poles is the same. Therefore, as a little reflection will show, when the sun is in one of the tropics, all the polar circle in the same hemisphere will be within the illuminated region (because it will be within 90 degrees of the sun) during the whole of a diurnal revolution, while the other polar circle will be in the region of darkness. These circles, therefore, have one day of 24 hours and one night of the same length in each year. From the polar circles to the poles the time of the longest day increases fast, and in the same measure the length of the longest night. Notwithstanding the inequality of the periods of light and darkness in the different parts of the earth each portion of the earth's surface has the sun above its horizon every year precisely six months, and below it the same length of time.

A day, in law, includes the whole 24 hours from midnight to midnight. In reckoning periods of time from a certain event the day on which the event occurred is excluded. On the other hand, if it be required to prove survival for a certain number of days, it will suffice if the person be alive for any portion, however small, of the last day. While an obligation to pay on a certain day would therefore be theoretically discharged by payment before midnight, the law requires that reasonable hours be observed — for example, if the payment (as a bill) is at a bank or place of business, it must be within business hours.

A lawful day is a day in which there is no legal impediment to the execution of a writ — that is, a day may be unlawful, *dies non juridicus,* either by common law or specific statute. By common law Sunday is a day on which the service of a writ cannot legally be made. Other days have been made holidays by both State and Federal statute in this country, and no such legal holiday is a lawful day.

Days of Grace.— The time at which a note is at maturity is in general three days after the time expressed on the face of it; the additional days are called days of grace. These days must be lawful days.

DAY OF ATONEMENT. See ATONEMENT.

DAY-BLINDNESS, or **HEMERALOPIA.** See VISION, DEFECTS OF.

DAY OF THE DEAD. See MYTHOLOGY, *Growth of Myths.*

DAY LILY, the popular name for a genus of lilies (*Hemerocallis*), natives of temperate Asia and chiefly of eastern Europe, grown in gardens. They have long radical leaves, and a branched few-flowered scape, with handsome large blossoms, the segments of which are united into a tube. The flowers are found in meadows and along streams throughout the Atlantic seacoast from New Brunswick to Virginia, and west to Ontario and Tennessee. A species with bright yellow flowers (*H. flava*) is sometimes found near old gardens. The name of the genus is from Greek signifying «beautiful for a day.» In Europe these plants are sometimes cultivated as fodder for cattle. A Japanese plant, *Funkici subcordata,* is also known as the day lily.

DAY OF THE LORD. Sometimes called the Day of Jehovah, or Day of Jahweh. A term originating in the Old Testament eschatology of the 8th century B.C. The Day of the Lord was to come when Jehovah would interfere in the affairs of Israel and deliver them from their misery and their foes. Hence the Day of the Lord is always spoken of as a day of judgment, not as an end, but in order that salvation may come. The judgment may be administered by some distant nation and would be accompanied by the terrors of the Lord. The prophets regarded the day as near at hand. While the day was primarily a day of judgment on Israel, yet it was to include all nations.

DAY NURSERIES, institutions for the care of those infants whose mothers' occupations oblige them to work away from home during the day. The movement originated in France under the leadership of Marbeau in 1844. A society was formed for the propagation and support of these nurseries, which was so successful in its efforts as to induce the municipal boards of charities to include these institutions in their programs. Some of the «crèches,» as they are called in France, are still supported by private contribution. The movement was carried to Austria, Germany, Spain, Russia and other countries. In the first-mentioned countries, they became public institutions. In the United States, the first day nursery was founded in New York city in 1854. From insignificant beginnings, it grew to include a hospital, and changed its name to Nursery and Child's Hospital. Now nearly all of the larger cities of the country have such establishments, supported by private philanthropy. The Association of Day Nurseries of New York City was founded in 1897; and in 1898, the National Federation of Day Nurseries held its first meeting at Chicago. In England, the British National Society of Day Nurseries was established in 1901.

The need for these foundations is increasingly great with the more extensive occupation of women in industries. Children are generally admitted between the ages of two months and six years. They are left there in the morning before the mother goes to work, and are called for on her return home in the evening. It is desirable that the nurseries be adequate in size for the neighborhood and well scattered throughout those portions of the city where social conditions demand them, so as to render them readily accessible to the mothers. Plenty of air and light, spacious rooms and out-of-door playgrounds are necessary requisites. The work of the nursery is primarily concerned with medical attention for the children entrusted to it; and with provision for food and occupation of those children during the day. The mothers also receive advice as to the care of the children. Ramifications of the work have carried the efforts of the day nursery into close touch with other social agencies. Kindergartens, lunchrooms for school children of working mothers, and playgrounds to keep these older children busy after school until the mothers return, have been added. A small fee is paid for the daily care of the child.

DAY OF SECTIONS, in French history, 4 Oct. 1795, when the National Guard attacked the Convention in the Tuileries. The forces of the government, under command of Napoleon, disarmed the regiments in the different sections, the first clash occurring in the Rue Saint Honoré.

DAYFLY, a name sometimes used for the well-known Mayfly. A neuropterous insect of the family of *Ephermeridæ*. The aquatic infant stages of larva and pupa are unusually long, often extending to 10 months; but the adult period is short, and is passed without taking food, and covers only a few hours, never more than a day. The mouth is atrophied in the adult, which passes through an immature winged stage known as the subimago. The body ends in two or three long thin tails. The membranous front wings are much bigger than the hind wings. In the early summer Mayflies abound in great numbers about northern lakes and rivers, furnishing food for other insects, and for crustaceans and fish. See NEUROPTERA.

DAYLIGHT SAVING. A movement originated in England by William Willett (1857–1915) in 1907 by the publication of a booklet entitled 'The Waste of Daylight.' Briefly stated, his scheme aimed at securing more daylight leisure for recreation and lessening the work performed by artificial light during the summer months. This was to be brought about in the following manner: The hour between two and three o'clock in the morning of each of the first four Sundays in April should be a short hour consisting of only 40 minutes, while the same hour in four Sundays in September was to be reckoned as 80 minutes. Greenwich and Dublin mean time were to be retained for purposes of astronomy and navigation, as well as for legal and parliamentary documents unless otherwise signified. Shorn of technicalities, it simply meant that during the summer months people should rise an hour earlier than usual in the morning, begin work an hour earlier and finish an hour earlier in the afternoon or evening. The value of early rising has been extolled by wise men of all ages. «Daylight saving» has been practised in the oldest of all industries — agriculture — probably since the creation of man; from the earliest times down to the present day it has been, and still is, in active, daily operation among the bulk of mankind — in Asia, Africa, Australia and the agrarian communities of America and Europe. To the so-called «working classes» it would be superfluous to preach the «early to bed and early to rise» doctrine: upon them the rising part at least is a life-long obligation. Early rising has become almost a lost art among the «higher ranks» of city dwellers; gas, electric light and the multiplication of amusements have added at least half of the night on to the end of the normal day and produced the natural result of later rising in the morning. Benjamin Franklin was perhaps the first to draw attention to the anomaly of burning expensive artificial light in the evening whilst an abundance of free daylight was wasted in the morning by late rising. In March 1784 (while United States Minister to France) he published in the Paris *Journal* a long, humorous letter headed, 'An Economical Project,' in which he related that he was in «grand company» one evening where a newly-invented lamp was introduced. «I went home, and to bed, three or four hours after midnight, with my head full of the subject.» Suddenly awakening at six in the morning, he was «astonished,» not only to find that the sun was shining, but «that he gives light as soon as he rises.» But for the accidental wakening, he says, «I should have slept six hours longer by the light of the sun, and in exchange have lived six hours the following night by candlelight. . . .»

The movement started by Willett produced a heated controversy in the British Empire that spread over six years. Numerous municipalities and corporations welcomed the proposal and several private firms adopted it, though not by altering the clock, but by commencing daily operations an hour earlier. The fiercest opposition to the scheme came from prominent scientists and learned societies. Early in 1908 a «Daylight Saving Bill» was introduced in the House of Commons and, after passing a second reading, was referred to a Select Parliamentary Committee, which reported favorably on it, stating that the proposal would not only be beneficial to the general health of the community at large, but would curtail expenditure on artificial light. The bill, however, did not reach the final stages in the House; a similar bill was introduced in the following year and also referred to a select committee, which reported against it. One of the main objections was advanced in behalf of meteorological instruments designed to record continuously day and night, and the system of daily international telegraphic reports of synchronous observations upon which weather reports are based. It was pointed out that acts of Parliament could produce no effect upon daylight; that gas or electric light could be saved by making more use of daylight without alteration of clocks, and that it would be just as reasonable to change the readings of the thermometer at a particular season. The late Sir John Milne, the astronomer, wrote, «The only people that have a shifty time are Mahommedans and savages, and it is now suggested that we should . . . join their ranks.» Other prominent men asserted that the proposal was based upon self-deception, «rising at five and making yourself believe it is six o'clock.» M. Charles Lallemand, scientist and administrator, was appointed by the French government to investigate and report upon the scheme. He condemned it *in toto*, maintaining that the position of the sun in the sky afforded the proper determination of time, and that an arbitrary displacement of noon, combined with differences of longitude, would operate very unequally in districts east and west of Paris, and that Brest would be as much as one and a half hours' away from true time. Up to the outbreak of the European War repeated efforts were made in Great Britain to promote legislation on the subject, but without success. Willett died 4 March

1915. Though he did not live to see his cherished plan adopted except in isolated cases, he knew that it was supported by over 700 city corporations and town and district councils, as well as by hundreds of societies and associations. The year 1916, however, was destined to witness a remarkable translation of theory into practice in the way of «daylight saving.» In April its adoption was contemplated in Austria. On 8 May the question was raised in the House of Commons and advocated as a war measure of economy. Sir Henry Norman estimated that altogether $12,500,000 would be saved in lighting. A bill was introduced on 10 May, passed through both houses, received the royal assent on the 17th, and came into operation three days later. Farmers and munition workers expressed disapproval, the former deciding to adhere to the real as against the «sham time» shown by the public clocks. Although the bill referred explicitly to the year 1916 it gave power to extend the operation of the act in any year, so long as the war continued. Instead, however, of adopting the complicated Willett plan, it was decided to advance the clocks by a full hour on 21 May and return to normal time on 1 October. The same month (May 1916) the system was introduced in Denmark, Germany and Holland; Italy, France and Portugal followed in June. In Germany, permanent adoption of the scheme was proposed in July; New Zealand rejected (after passing) it in August; Tasmania adopted it in September; Victoria in November, and the Australian Dominion Parliament passed the measure to take effect in January 1917. The city corporation of London proposed permanent adoption, and in October it was actively urged in the United States. Norway decided in favor of daylight saving in May 1916, but rejected it in April 1917, as also did Denmark and Sweden in the same month, while Spain adopted it in May, at the same time that the Australian Cabinet decided to repeal the act. Turkey, Switzerland and Russia also adopted daylight saving; Nova Scotia and Newfoundland were the pioneers of the scheme in the New World. The French bureau in February 1917 suggested an international daylight saving conference to be held after the war. On 17 April 1917 a bill drafted by the National Daylight Saving Association was introduced in the United States Senate by Senator Calder of New York. It was pointed out that New York city could save $1,500,000 annually in gas alone. The American Federation of Labor welcomed the plan; the American Astronomical Society was divided as to its value, voting 18 in favor, 22 against, 6 neutral. The measure was passed 27 June 1917 without a roll call, to take effect on the last Sunday in April 1918. Actually, it came into force at 2 o'clock in the morning of Easter Sunday, 1918. Consult *The Independent,* 19 Feb. and 5 May 1917; *Current Opinion,* 17 Feb. 1917; *Nature* (London), 9 July 1908; 11 March 1909; 22 April 1909; 6 April 1911; 27 April 1911; 11 May 1911; 27 April 1916; 4 May 1916; 11 May 1916; New York *Herald,* 17 March 1918; New York *Sun,* 24 March 1918; 13 Jan. 1918; Smyth, A. H., ‘The Life and Writings of Benjamin Franklin (Vol. IX, New York 1906).

HENRI F. KLEIN,
Editorial Staff of The Americana.

DAYS OF GRACE. The time of delay allowed for a bill to become actually due and payable, except in the case of bills payable on demand or at sight. In the United States and Great Britain the period is three days after the time expressed on the face of it, and these three additional days are called days of grace. In the United States, a bill or note becoming due on a Sunday or a holiday is payable on the first business day thereafter, but in England if the third day of grace falls on a Sunday, Christmas Day, Good Friday or a national fast or thanksgiving day, the bill is payable the day before.

DAYTON, Elias, American soldier: b. Elizabethtown, N. J., July 1737; d. there, 17 July 1807. He joined the British forces in 1760 which were employed in completing the conquest of Canada from the French; and he subsequently commanded a company of militia, with which he marched on an expedition against the northern Indians. He took part in the important battles of Springfield, Monmouth, Brandywine, Germantown and Yorktown. After the war he served several terms in the legislature of his native State.

DAYTON, John, American state governor: b. about 1761; d. Charleston, S. C., 27 Nov. 1822. He held several government offices, was chosen governor of South Carolina in 1800 and again in 1808, and was afterward appointed judge of the United States District Court, a position which he held until his death. He published ‘A View of South Carolina,’ and ‘Memoirs of the Revolution’ in that State.

DAYTON, William Lewis, American jurist and statesman: b. Baskingridge, N. J., 17 Feb. 1807; d. Paris, 1 Dec. 1864. He was graduated at the College of New Jersey in 1825; and was admitted to the bar of his native State in 1830. In 1838 he was chosen one of the associate justices of the Supreme Court of New Jersey, which position he resigned in November 1841; and in 1842 was appointed by the governor to fill a vacancy in the United States Senate. At the expiration of his term he resumed the practice of his profession at Trenton; and in 1856 was nominated by the Republican national convention as their candidate for the Vice-Presidency of the United States, with Fremont as the candidate for President. He was attorney-general of New Jersey 1857–61, and was Minister to France 1861–64.

DAYTON, Ky., city in Campbell County, on the Ohio River, and the Chesapeake and Ohio Railroad opposite Cincinnati. The manufactures include watch cases, pianos, whisky; and among public buildings are good schools and the Speers Memorial Hospital. Dayton was settled and incorporated in 1849 as Jamestown. It received a new charter in 1893. Pop. 6,979.

DAYTON, Ohio, city and county-seat of Montgomery County, at the confluence of the Great Miami, Mad, and Stillwater rivers and Wolf creek. It is on the Erie, the Big Four and the Pittsburgh, Cincinnati, Chicago and Saint Louis and the Baltimore and Ohio railroads, 67 miles southwest of Columbus and 60 miles north of Cincinnati. There are 125 trains entering the city daily. The union station was opened to the public in July 1900, and cost including tracks $900,000. The city has an area of 17 square miles.

Manufacturing Interests.—While Dayton's manufacturing industries are widely diversified and include the manufacture of cash registers, railroad cars, water-wheels, agricultural implements, sewing machines, foundry work, etc., these are conducted on so large a scale that many establishments employ from 500 to 2,500 hands. According to the United States census of 1900, the average number of wage-earners in the city was 16,869; the total wages paid was $7,959,792 and the value of the productions was $35,697,695. Great progress was made since 1900 and careful estimates show that in 1918 the average of wage-earners had increased to 38,500 with a total wages paid of $20,000,000 and the value of the products $180,000,000.

In 1918 there were 130 factories engaged in making supplies and ammunition for the United States government. The city's industrial prestige lies largely in the manufacture of airplanes, automobile starting, lighting and ignition systems, cash registers, recording devices, electric lighting systems for homes and farms, cigars, toys and paper box goods.

Street Railways.— Seven interurban electric roads radiate from Dayton forming an important network in the traffic of the Central States. There are 10 local car lines with total mileage of 85.

Government.— Dayton is the largest city in the United States operating under the commission-manager form of government, the new city charter having become operative 1 Jan. 1914. Five commissioners are elected by the people and the commissioners choose a city manager. The manager and commissioners are subject to recall and the initiative and referendum is incorporated in the charter. The municipal government is divided into several divisions, as follows: Service, which oversees all matters pertaining to streets and alleys; street repairs, city asphalt plant, garbage and ash removal, the operation of the municipal garbage reduction plant, boulevards and roadways, etc. The Safety Department supervises management of the fire and police department. The Finance Department is concerned with the receiving and disbursing of public moneys, city purchasing agent and all license fees. The Law Department protects the city's legal interests, drafts ordinances, etc. The Welfare Department oversees all municipal recreational facilities, parks and playgrounds, public health and sanitation, public nursing, etc. Since the operation of the commission-manager form of government, the city has centralized all public health nursing, erected a leprosorium, garbage reduction plant, which sells grease, established numerous medical clinics and baby feeding stations and a crime prevention bureau. The city has acquired the largest country club, municipally owned, in the world, a tract of 294 acres donated by John H. Patterson. A policewomen's bureau is also maintained. In safeguarding health and social conditions, the municipality works in intimate relations with all local social service agencies. Free legal aid is administered the poor. Each department is presided over by a director commanding a salary of $4,000 a year and each department is subdivided into divisions and bureaus for specific service. The city manager receives $7,500, the commissioners $1,200 each and the mayor, who is the commissioner receiving the highest vote cast in the election, $1,500. The municipal revenues for 1917 were $1,310,510.21 and the expenses were $1,354,610.67, making an excess expenditure of $44,100.46, due to increased cost of materials on account of the war. The tax rate for 1918 was $1.56 on the hundred dollars. Total value of municipal property was $13,675,000, including lands, buildings, stock, automobiles, mechanical equipment, etc.

Banks and Banking.— Dayton has 15 national and State banks, including two savings and trust companies with deposits aggregating $36,000,000. Bank clearings in 1917 were $177,134,087.65. During the year 129 corporations were chartered under Ohio laws adding to Dayton capital $15,881,750 net. The city has 18 building and loan associations with total deposits of $38,000,000. This is one of the strongest features of Dayton life. Through these agencies approximately 30 per cent of the residents of Dayton own their homes.

Education.— There are 32 public schools, with total enrolment of 21,300, including adult night classes. There are three high schools, a normal training school and special schools, largely in the nature of classes for defectives, cripples and sub-normal children. One high school, Parker, is for freshmen only. Stivers Manual Training High School is said to be one of the most complete in the country. Manual training centres are maintained in eight schools; home economic centres in nine schools while sewing is taught in all high schools and in the seventh and eighth grades in all elementary schools. There are three night school centres.

Catholic churches have 15 parochial schools with enrolment in excess of 7,000. There is also one Lutheran parochial school. Saint Mary's College, maintained by the Brothers of Mary, has an enrolment of 600 students and fine laboratory equipment. The United Brethren Church has a theological seminary here, Bonebrake, and the Reformed Church, Ohio synod, maintains its theological school in this city, Central Seminary.

Dayton has 130 churches, a magnificent Y. M. C. A. and Young Women's Christian Association and Young Women's League. Its charity and social welfare agencies are co-ordinated through the federation for charity and philanthropy.

There is considerable civic, philanthropic and social welfare activity in Dayton and 40 organizations at this time are engaged exclusively in war work. Co-relating war, social welfare, commercial and civic efforts, is the Greater Dayton Association, made up of 2,000 Dayton men and women and engaged in a multiplicity of community services.

Public Library.— Dayton had the first library incorporated in the State, one having been established in 1805. The public library was opened in 1855 and is supported by public taxation, having an income of $18,000 per annum. The total number of volumes recorded 1 Jan. 1918, was 100,000. There are four daily newspapers, besides 25 church and other publications. There are also two large church publication houses.

Hospitals.— The city hospitals include the

Saint Elizabeth Hospital, the Miami Valley Hospital, and the District Tuberculosis Hospital. The Dayton State Hospital for the insane is maintained by the State. The Hospital of the National Military Home which adjoins the city is the largest military hospital in the world and has an average of 600 patients, all of whom are veteran volunteer soldiers of the Civil and Cuban wars. There are several private hospitals.

History.— The town was laid out in November 1795 by Gen. Israel Ludlow and was named after Gen. Jonathan Dayton. The first settlers arrived in the spring of 1796. Situated in the Miami Valley, one of the most fertile valleys in the United States, producing for many years great crops of corn, wheat, tobacco and numerous cattle, sheep and horses and with abundant water power to develop its industries, Dayton has grown to be the third largest manufacturing city in the State. From Dayton (c. 1900–06) the Wright brothers (q.v.) developed aviation. With its industries so diversified, its banks and building associations so strong and uniformly successful and with its people so well educated, it is one of the richest and most prosperous communities in the Union. Pop. (1900) 85,333; (1910) 116,577; (1918, estimated) 151,000.

JESSE B. GILBERT,
Associate Secretary of the Greater Dayton Association.

DAYTON, Tenn., city and county-seat of Rhea County, on the Cincinnati, New Orleans and Texas Pacific Railroad, 75 miles southwest of Knoxville. It is in the centre of a coal-mining and agricultural district; and iron, machinery, lumber, bricks and flour are the chief manufactures. Pop. 1,991.

DAYTON, Wash., city and county-seat of Columbia County, on the Touchet River, and the Washington and Columbia River, and the Oregon railroads. It is about 28 miles, in direct line, northeast of Walla Walla and 50 miles southwest of Colfax. It is situated in one of the best agricultural regions of the State, and its trade is largely in agricultural products, wheat, barley, fruit, hogs and cattle. It contains stores, banks, large flouring-mills and well-built courthouse, city hall, churches and schools. Pop. 2,500.

DAZA, dä'zä, **Hilarion,** Bolivian general and ex-President: b. Sucre 1840; d. 28 Feb. 1894. In 1857 he enlisted as a soldier in the famous battalion of Colonel Balsa, and was rapidly promoted. On 24 Nov. 1870, by an act of treachery he deprived President Melgarejo of office, and defeated him in an engagement 15 Jan. 1871. After that he was practically the arbiter of the destinies of the country for several years. By the *coup d'etat* of 4 May 1876, he became President in place of Frias. The army deposed him 27 Dec. 1879. He went to France, but after a few years returned to Bolivia, and in that country was assassinated.

D'AZEGLIO. See AZEGLIO, MASSIMO TAPARELLI, MARQUIS D'.

DEACON (from the Greek *diakonos,* a servant), a person who belongs to an inferior order of ministers in the Christian Church. Seven were apparently first instituted by the apostles (Acts, chap. vi), which number was retained a long time in several churches.

In the Roman Catholic Church, a sacred minister whose functions are to assist the priest in the liturgical service and in the administration of the sacraments; also in emergencies to baptize, to preach and to administer the Eucharist. These three functions it is not lawful for the deacon to discharge without express authority from the bishop save in case of necessity. But in the first ages of the Church it was the deacon that gave the communion, in both species, to the faithful in the public liturgical service and at their homes in case of sickness. In the present usage of the Church the diaconate is, save in exceptional cases, simply a step toward the priestly state and office and for the deacon as such there is no recognized place in the economy of the Church.

In the English Church, also, the diaconate is merely a step toward the priesthood, and the deacon's duties are all in the way of assisting the priest. He preaches only by episcopal permission, and he cannot consecrate the elements of the Lord's Supper, or pronounce the absolution. No person can be ordained deacon before he is 23 years old, except by dispensation from the archbishop of Canterbury. The office of deacon in other churches varies considerably, and some, of course, have no functionaries bearing this name.

In the Methodist Episcopal churches, the junior order of priesthood, the novitiate being first ordained a deacon, and then after a time, if satisfactory conditions have been fulfilled — such as progress in grace and gifts, and the probation of character — elevated to the full priesthood or eldership — the latter the highest order in the Church — the bishops occupying not a superior ecclesiastical order, but holding a merely supervisory office.

In the Presbyterian churches, the orders here are teaching elders, or ministers, ruling elders, generally called simply elders (these two orders looking over the spiritual affairs of the congregation); and deacons (now gradually being displaced in many places by managers), to attend to the more secular matters.

In the Congregational, Baptist and other churches, deacons are spiritual officers ranking immediately after the minister, and looking after both the spiritual and the temporal concerns of the congregations. In the Eastern churches the office of deacon as it existed in the early Church has been preserved with slight modifications. Consult Hort, 'The Christian Ecclesia' (London 1897); Lindsay, 'The Church and the Ministry in the Early Centuries' (ib. 1902); McGiffert, 'The Apostolic Age' (New York 1897); Seidl, 'Der Diaconat in der katholischen Kirche' (Regensburg 1884).

DEACONESSES, in the time of the apostles, were usually widows who assisted in the solemn baptism of women (by immersion), instructed female catechumens in the doctrines and usages of the Church, visited those of their sex who were sick or were in prison for the faith's sake, dispensed the alms of the faithful, and kept order in the women's part of the assembly room during the liturgical service. That the deaconesses were in the earliest times widows, and not maids or married women, appears from the curious fact that Saint Ignatius, disciple of Saint John the evangelist, speaks of "virgins who are called widows"; as clear a proof of the original custom of choosing widows only to be deaconesses, as would be the formal declaration that such custom existed. For a long time it was required that the deaconesses should be not less than 60 years old; by the councils of Chalcedon and in Trullo the age of 45 years was made the minimum; by the Council of Chalcedon deaconesses were forbidden to marry; and no widow who had married a second time was ever admitted to the rank of deaconess. The institution of deaconesses was extinct in the Western Church in the 10th century and in the Greek Church in the 12th; but it survives in churches of the Syrian rites.

The work done by the deaconesses in the early centuries is performed now, in the Roman Catholic, and in many of the Protestant Episcopal, churches by the nuns. (See SISTERS). In the 19th century the order of deaconesses was revived in several of the Protestant churches. Theodore Fleidner (1836), of the United Evangelical Church of Prussia, founded a home for deaconesses, in Kaiserswörth, Prussia. Germany has several homes, and in 1855 the order was established in Baltimore, Md. The General Convention of 1889 adopted a canon regulating the order and providing that members should have adequate preparation both technical and religious, extending over a two-year period. Training schools are maintained in New York and Philadelphia. The Methodist Episcopal Conference in 1888 provided for the establishment of an order of deaconesses, and this church now has many homes in the United States. The Lutheran Church also maintains several homes, the first being established in New York in 1852. In 1891 the Presbyterians instituted the order. Consult Golder, 'History of the Deaconess Movement' (Cincinnati 1903); Nutting and Dock, 'History of Nursing' (New York 1907); Potter, 'Sisterhoods and Deaconesses' (London 1898); 'Year Book' of the New York Training School for Deaconesses (New York 1892–1915).

DEAD, in nautical language, a word frequently employed as part of a designation or phrase having, in general, a meaning somewhat opposite to that of active, effective or real. The chief of such phrases are the following: Deadeyes: circular, flattened wooden blocks, without sheaves, and having eyes for lanyards, which form a purchase or tackle whereby the shrouds or other parts of fixed rigging are extended or set-up taut; dead-flat: the name for one of the midship-timbers; dead-lights: strong wooden shutters used to close cabin windows, on the approach of a storm, to protect the glass; dead-ropes: such as do not run in blocks; deadwood: the term applied to the solid blocks of timber erected upon the keel throughout the sharp portions of a ship's hull at stem and stern, the chief object being to give solidity and strength to the ends of the ship.

DEAD, Book of the. See BOOK OF THE DEAD.

DEAD, Disposal of the. In every age and in all countries, the living have shown their respect for the dead by various modes of burial ceremony, and the religion and laws of all countries reflect in large measure this feeling of reverence for the memory of those who have gone before. The methods of disposal of the dead are many, and historic romance has preserved for us many interesting and pretty customs. In the main, however, three methods are largely employed by modern peoples — burial, embalming or its modifications or cremation with its modifications. It is impossible to tell which method has the greatest antiquity, but probably simple burial antedated the other, since cremation and embalming usually imply a complex religious development. The Hebrews, the Greeks and the Romans in the main buried their dead, their burying-grounds having been located outside of town walls; but cremation also was largely practised by the Greeks, and it has been thought that Hebrews at one time likewise burned their dead. As is well known, embalming was widely customary among most of the nations of antiquity, although the Egyptians may be said to have been the foremost of those employing it.

The argument in favor of cremation is based principally on sanitary grounds, and despite the general sentiment against it, cremation has made considerable progress in the United States and other countries. There are crematories in many of the leading cities of America, and while much of the feeling against cremation has undoubtedly passed away, there is still great general dislike to burning of the dead.

Apart from methods of antiquity, the problem of disposing of the dead with least danger to the living is, from the medical point of view, one of great interest. Its discussion is by no means of recent origin, however, for the early Italians, French and English contributed learned treatises on the subject. It would seem that from the scientific point of view most of the modern writers and those of the Middle Ages strongly favor cremation as one of the cleanest and most efficient modes of disposal of the dead, and it is a matter of history how the ancient Etruscans and others had their burial urns in which to keep the ashes of their forbears.

The method of burial beneath the ground is condemned by practically all sanitarians, but it will probably be many generations before the custom is abandoned, if indeed it is ever to be given up. As to actual dangers that may arise from dead bodies buried beneath the ground, it cannot be claimed that these are imminent. Disease is mainly transmitted from the living person, and now that we have more definite knowledge of factors involved in the transmission of disease, the bogy of danger arising from burial has little terror for us. It can hardly be claimed with much show of justification that such a water-born disease as typhoid can originate from the water that may percolate through the ground in cemeteries and ultimately reach a potable supply. This danger is theoretical rather than practical, and the amount of time spent in devising methods to prevent such contamination would be much more rationally employed in taking care of the excreta of the living. The contamination of the earth, the air and the water is, therefore, really of secondary importance; yet it cannot be denied that, excepting some exclusive cemeteries, the present methods of burial are disgusting; and in times of war or pestilence not only is burial disagreeable, but there is no doubt that contagion may arise from it, and hence special portable crematories have an undeniable place. See CREMATION OF THE DEAD.

DEAD-LETTER OFFICE. The department of the General Post Office at Washington, D. C., to which all undelivered or technically «dead» mail is sent, and from which, after examination, such mail, whenever possible, is returned to the sender. See Post and Postage.

DEAD LINE. A phrase which probably originated during the Civil War. In some of the prison camps a line was drawn through or around the camp. If a prisoner attempted to cross the line he was shot at once. To the men it became the dead-line. In a figurative sense it applies to the age-limit of efficiency.

DEAD-MEN'S-FINGERS, an English fishermen's name for the *Alcyonium*, a genus of polyps, the typical one of the family *Alcyonidæ*, characterized by the polyps of the colony having eight hollow arms and eight mesenteries, and a skeleton composed of separate calcareous spicules. It contains many well-known species, such as *A. digitatum*, or sea-finger (dead-men's-fingers, known also to fishermen as dead-men's-toes, and cow's-paps), and *A. glomeratum*. A common species on the United States Atlantic coast is *A. carneum*. The name is also applied to certain species of branching sponges.

DEAD-NETTLE, a common name applied to the genus *Lamium* of the natural order *Labiatæ*, mint family. It is an annual or perennial herb, of which there are about 40 species, all natives of the Old World. It has been naturalized in America, and several species are found in waste places and cultivated ground from New Brunswick to Florida and west to Ontario, Minnesota and Arkansas. The best-known species are *L. purpureum* and *L. album*, which are used in the northern parts of Europe as pot-herbs. A species of the genus *Galeopsis* (*G. tetrahit*) is called dead-nettle, as is one of the species of *Stachys* (*S. palustris*). It was an old belief that the hairs of the dead-nettle, when dry, caused irritation to the exposed parts of persons coming in contact with the plant, and that this, extending through the system, sometimes caused death; hence the name.

DEAD RECKONING, computation of a ship's position without recourse to astronomical observations. This reckoning is computed from the following data — the longitude and latitude sailed from or last determined; the course or direction sailed (determined from the compass); the rate of sailing; and the time elapsed. These data are liable to many inaccuracies, due to currents, change in declination of the compass. The results arrived at by this method of reckoning are corrected as soon after as is possible by sun or stellar observation. See Navigation.

DEAD SEA, the usual name given to a most remarkable lake in the southeast border of Palestine, called in the Old Testament «The Salt Sea,» «Sea of the Plain» or «East Sea»; by Josephus, «Lacus Asphaltites»; and by the Arabs now, *Bahr-Lût*, «Sea of Lot.» It lies along the line of a great fault from the Gulf of Akaba at the head of the Red Sea to Hermon. It is 47 miles long, with a breadth of from 5 to 10 miles and occupies an area of 340 square miles. Its surface, which is lower than that of any water known, is 1,292 feet below the level of the Mediterranean. There is evidence that its level was nearly 1,200 feet higher than now. The depth of the greater part of the northern section is about 1,300 feet; but at the south end the water is only from 3 to 12 feet deep. The shape is that of an elongated oval, interrupted by a promontory which projects into it from the southeast. The Dead Sea is fed by the Jordan from the north and by many other streams, but has no apparent outlet. It is estimated that 6,000,000 tons of water flow into it daily, almost all of it being carried off by evaporation. Along the eastern and western borders of the Dead Sea there are lines of bold, and in some cases perpendicular, cliffs rising in general to an elevation of 1,900 feet on the west and 2,500 feet on the east. It is a striking fact that these cliffs are all composed of limestone on the west, and on the east of sandstone of gorgeous hues, and are destitute of vegetation except in the ravines traversed by fresh water streamlets. The northern shores of the lake form an extensive and desolate muddy flat, marked by the blackened trunks and branches of trees, strewn about and encrusted with salt. The southern shore is low, level and marshy, desolate and dreary. On this shore is the remarkable ridge of rock-salt, 7 miles long and 300 feet high, called Khashm Usdom (Ridge of Sodom). Lava-beds, pumice-stone, warm springs, sulphur and volcanic slag suggest the presence here of volcanic agencies at some period; but some modern geologists declare that no active volcanoes have ever existed in this vicinity; and that the subsidence of the Jordan Valley occurred in the Tertiary Period. On the other hand it is claimed by modern travelers that the neighborhood of the Dead Sea is frequently visited by earthquakes, and the lake still occasionally casts up to its surface large masses of asphalt. The long-entertained belief that the exhalations from this lake were fatal is not founded upon fact. The absence of bird life is most impressive. The salinity of the waters is adverse to life, though some lower organizations are found in them. The region of the Dead Sea is rich in all kinds of minerals; copper mines were worked in the Byzantine period near the southern end; bitumen and sulphur are abundant, and its basin is rich in marble, porphyry, and other fine stones.

The water of the Dead Sea is characterized by the presence of a large quantity of magnesian and soda salts. Its specific gravity ranges from 1172 to 1227 (pure water being 1000). The proportion of saline matter is so great that, while to every ton of water in the Atlantic there are 31 pounds of salt, in the Dead Sea are 187 pounds. Its water contains 23 per cent solid matter, and is, bulk for bulk, heavier than the human body. In all lakes or collections of water without any outflow, the water acquires an infusion of salt, its feeders constantly bringing in this material, while none can go off by evaporation, even when the shores do not as here abound in salt and nitre. The evaporation is great as the heat is intense, and the sea but slightly increases its area. Rain hardly ever falls; the water is nearly as blue and clear as that of the Mediterranean; and though its taste is horribly salt and fetid, a bath in it is refreshing. Owing to the great specific gravity of the water, it is almost impossible for the bather to sink in it, strive as he may. Several of those who have navigated and explored the sea have fallen victims to a fatal fever. For the story of the 'Cities of the

Plain,' see Gen. xix; but according to Captain Conder, "it is now generally agreed that the Dead Sea and Jordan were formed by a great fault or crack in the earth's surface long before the creation of man, and that the district presents in our own days much the same aspect as in the days of Abraham. It is vain, therefore, to suppose that the 'Cities of the Plain' were beneath the present sea, though this view was held as early as the time of Josephus."

The Dead Sea was first navigated by Costigan, an Irish traveler, in 1835, and he was followed by Molyneau, a British officer, in 1847, neither of whom survived their experiences. Lynch, an American traveler, was the first (1848) to explore its coasts and to take soundings of its depths. Consult Abel, 'Une Croisière autour de la Mer Morte' (1911); Blanckenthorn, 'Naturwissenschaftliche Studien am Toten Meer und im Jordantal' (Berlin 1912); Schmidt, in 'The Fifth Annual Report of the Director of the American School for Study and Research' (1905); Tristram, 'The Land of Moab' (1874).

DEAD SOULS. Gogol was indebted to the great Russian poet, Pushkin, for the subject of his "epoch-making" satire, 'Pokhozhdyéniya Chichikova ili Myertvuiya Dushi.' (Chichikof's Adventures or Dead Souls' — perhaps better translated 'Dead Serfs') and to 'Don Quixote' for its plan. Under the old régime in Russia the serfs, "fastened to the soil" by the economic regulations of the usurper Tsar, Boris Godunóf, who was compelled to stop by drastic measures the emigration of farmhands, were regarded as personal property and the pomyéschiki, or landed-proprietors, were allowed to mortgage them to the State bank. The census was taken only once in ten years, and it naturally happened that in those intervals many of them died. It was argued that the birth-rate would offset the death-rate, so that taxation on the basis of the previous enumeration would be fairly equitable. In Gogol's tale, which he called a Poem, a wily rascal, the Collegiate Councillor, Pável Ivánovitch Chichikof, conceives the scheme of going about from place to place and getting by hook or by crook, by purchase or by gift, the title to such serfs as had died since the previous census. With the long list thus acquired he plans to borrow enough ready money to purchase a genuine estate with living souls. His journeys bring him into contact with all sorts and conditions of men and women. Gogol describes them without mercy, showing the deleterious influence of slave-holding on owner and serf alike. As in 'Uncle Tom's Cabin,' to which 'Dead Souls' has been compared, there is no attempt to preach; the implication is permitted to carry its own weight. The emancipation of the muzhiks had been advocated by the most enlightened Russians for many years, especially during the reign of the Emperor Alexander I (1801–25); during the reign of Nicholas I (1825–55), who was occupied with other affairs, the reform slumbered or at least was put aside, and not until Alexander II had come to the throne was the liberation actually effected. It had been made necessary by the demand of popular sentiment stimulated by 'Dead Souls' and by Turgénief's 'Recollections of a Sportsman.' 'Dead Souls' was to have consisted of three parts. The first part appeared in 1842 and created a sensation. A second edition followed in 1844. It naturally aroused bitter enmity among the proprietor-class who felt that they had been traduced. The author, who was a sick man, tried to make explanations; he begged his readers to wait for the conclusion before they formed their final judgments; but he grew more and more hypochondriacal; and in a fit of melancholy he burned the manuscript of the second part which was only partially finished; after his death in 1852, an earlier draft was discovered and incorporated with the first. Later a Dr. Zaharchenko of Kief took it upon himself to continue and finish Gogol's masterpiece, but it was a dead failure. The chief interest of 'Dead Souls' is historical: it depicts a condition forever passed away, but its gallery of portraits and of landscapes shows vividly what Russia was in the first half of the 19th century. Chichikof shrewd, plausible, tactful, ambitious; his lackey, Petrushka, taciturn, stupid, ugly; his coachman Selifan, talkative, with his head in the clouds and always getting lost; his troïka of horses (a three-fold Rosinante), each with its own individuality; his "brichka" with leather flaps and staring bull's-eyes; all are as familiar to the Russian reader as Don Quixote and Sancho Panza. In Russian literature the names and varied characters of Chichikof's dupes frequently appear without explanation: they are household words; and many of the sayings so wittily and often sardonically introduced by Gogol have become proverbs. The work is only a torso, but in its details it became the model for many successive Russian writers who affected his style of realism. "Myertvuiya Dushi" fills the third volume of the collected works of Gogol published in a beautiful edition by T. I. Hagen, Moscow 1884. It was translated by Isabel F. Hapgood and published, New York 1886, London 1888. It is analyzed by the Vicomte de Vogüé in 'Le Roman russe' ('The Russian Novelists,' Boston 1887), and in Ernest Dupuy's 'Great Masters of Russian Literature.' A more detailed life of Gogol, with analyses of his works and a bibliography, may be found in Louis Paul Marie Léger's 'Nicolas Gogol' (Paris 1914). 'Dead Souls' was translated into French under the title, 'Les Âmes mortes,' by Ernest Charière (Paris 1885); the first part was translated into German, as 'Die todten Seelen ein satirisch-komisches Zeitgemälde' by Philipp Löbinstein in 1872.

NATHAN HASKELL DOLE.

DEADLY NIGHTSHADE. See BELLADONNA.

DEADWOOD, S. D., city, county-seat of Lawrence County; on the Chicago and Northwestern, and the Chicago, Burlington and Quincy railroads. It is one of the principal trade centres for the mining camps of the Black Hills. A considerable amount of the gold, silver, lead and other valuable minerals found in the Black Hills is brought to Deadwood for smelting, refining or reshipment. Besides the large smelter and the cyanide reduction works, there are manufactories for mining implements and machinery, brick and planing-mills. The Masonic Temple is a large building. The first permanent settlement was made in 1876. Pop. 3,653.

DEAF, The («Deaf and Dumb,» «Deaf-Mutes»). The term «the deaf» is used in this article to designate the class of persons who are unable on account of deafness to be taught in ordinary schools and consequently must receive their education in special schools or through special teachers at home.

Such persons are sometimes called «deaf and dumb,» «deaf-mutes,» or simply «mutes.» The first schools established in Great Britain and America were named «asylums for the deaf and dumb»; then, as the character of their work became better understood, they were called «institutions for the education of deaf-mutes»; one or the other of these terms still persists in the corporate titles of a few of the older schools. But all that have been established within recent years have been entitled «schools for the deaf» and nearly all the older ones have changed their names to this title. There are excellent reasons for preferring the term «the deaf» to «deaf and dumb,» «deaf-mutes» or «mutes.» «Deaf and dumb» is objectionable for three reasons: (1) It tends to perpetuate the popular error that deafness and dumbness are two distinct physical defects, whereas there is only one, namely deafness. There is usually no imperfection in the vocal organs of the deaf, except such imperfection of development as may be the result of the lack of exercise; dumbness, where it exists, is simply the consequence of the deafness. (2) The word «dumb» in some parts of the United States carries with it an implication of stupidity and brutishness. The deaf child, even before it receives any education, is not «dumb» in this sense. (3) «Dumb,» even when it is properly used to indicate persons unable to speak on account of their deafness, is inaccurate if applied to the whole class of the deaf, for many of them, having lost their hearing by accident or disease after they had learned articulate language through the ear in the usual way, still retain their speech notwithstanding their deafness; and others, originally dumb from having been born deaf or having lost their hearing in infancy or early childhood, have acquired the art of speech through instruction and are no longer to be classed as dumb. The confusion of mind caused by the use of the term «deaf and dumb» in taking the thirteenth census of the United States in 1910 led to so many errors on the part of the enumerators that, as is stated in the bulletin of the census bureau published in 1915, «it was finally considered inadvisable to make any tabulation covering the total population returned as deaf and dumb.» The term «deaf-mutes» is preferable to «deaf and dumb,» but when applied to the whole class of the deaf it is equally inaccurate, and for the same reason; a large proportion of the deaf are not mute. «Deaf-mutes,» however, is a correct designation for persons deaf from birth or early childhood who have not acquired the power of speech through instruction. Happily, owing to the progress made in oral teaching within recent years, the number of persons belonging to this class is now much less than formerly. The abbreviated form «mutes» without the qualifying prefix «deaf» is objectionable for the same reason as «deaf-mutes,» and is open to the further objection that it suggests to readers of English literature the assistants of an undertaker at a funeral. The only proper designation for the whole class of persons under consideration in this article is «the deaf.» This is the term that is always used by their teachers and themselves in America and Great Britain, is incorporated in the titles of most of their schools, has been adopted in the annual reports of the United States Bureau of Education and the special report of the twelfth census, and is coming more and more into general use. There are several distinct classes of the deaf. These are, first, the two great classes of the congenitally deaf (those deaf from birth) and the adventitiously deaf (those who have become deaf at some time after birth). According to the thirteenth census of the United States the congenitally deaf constitute 39.3 per cent of the whole number and this percentage agrees pretty nearly with that of the statistics of schools for the deaf. But it is often impossible to be sure whether a child is congenitally or adventitiously deaf. Deafness is not usually discovered until he arrives at the age when children ordinarily begin to speak. He may have been born deaf or he may have lost his hearing later from some unobserved cause. An important distinction with respect to the education of the deaf is made by the division of the adventitiously deaf into the two sub-classes of «quasi-congenitally» deaf and «semi-mutes.» The quasi-congenitally deaf are those who lose hearing at some time during the first two or three years of life — sometimes even later — and, in consequence of the loss of hearing, also apparently lose the limited knowledge of language and speech they have acquired through the ear before deafness occurred. Like the congenitally deaf, these children are, and without instruction remain, true deaf-mutes. To them the spoken and written language of their fellow men is entirely unknown, and, even with the best education that special schools can give, they rarely attain to such a mastery of its idioms that they can use it with the accuracy and freedom that a hearing person does. There is, however, a subtle difference in the mental condition of congenitally deaf and quasi-congenitally deaf children. Up to the time they enter school, indeed, this difference is not apparent; the quasi-congenitally deaf child speaks and understands speech no more than the deaf-born child and he possesses no conscious memory whatever of the words he once heard or even used. But it must be that there still remains in his mind a dim, subconscious memory of those words and of language; for it is observed by his teachers that he acquires words, language, and speech more readily and quickly than the child who was born deaf or who lost hearing within a few months after birth. Persons who lose their hearing in later childhood, after they have learned to understand a great deal of language and to speak readily and fluently themselves, are known in schools for the deaf as «semi-mutes»; an awkward and objectionable term, since it does not accurately describe their condition and is not generally understood, but one for which no satisfactory substitute has been proposed. Even these may cease to speak if they are not encouraged by their family and friends to persist in the use of the voice; but their memory of words remains, especially if they have learned to write, and, if they receive proper encouragement, it is easy for them to retain the power of speech. When they are too deaf to hear their own utterance their voices are always peculiar and often disagreeable; but great improvement in this respect may be effected by the careful training of skilful teachers of articulation. Their mental condition is essentially different from that of the congenitally and quasi-congenitally deaf; not that their native capacity and learning ability is superior, but that their knowledge of language obtained before hearing was lost gives them an incontestible advantage over the deaf-born and the deaf from early childhood. The pupils who arouse admiration at public exhibitions by their fluent speech and good command of written language, and the deaf who distinguish themselves in later life as writers and poets, generally belong to the class of semi-mutes. Persons who become deaf in adult life retain their speech but, unless they receive special instruction in speech-reading, generally cannot understand much of the speech of others and so are more or less cut off from society and sometimes from their former business or profession. They usually feel their deprivation more keenly than those deaf from birth or childhood, but by persistent study of the art of speech-reading under competent teachers, for which opportunity is now offered in many places, they may often be to a large extent restored to the society of their families and friends and enabled to carry on their business or profession more successfully than at first seemed possible.

Another important classification of the deaf from an educational point of view is based upon the degree of deafness. There are all degrees of deafness, extending from a slight impairment of the hearing to a total inability to perceive through the ear the loudest sounds. Those who are only slightly deaf, who can hear well enough to be taught in ordinary schools, do not come within the scope of this article; but among those who are so deaf that they must be taught by special methods there are great differences in the degree of deafness. They are thus divided into two classes: the totally deaf, who have no hearing or scarcely any, and the semi-deaf, who can hear more or less. In a few cases of the semi-deaf the hearing power, even when before instruction it was so slight as to have remained unnoticed, may be so developed, or rather educated, by suitable acoustic training, with or without the aid of mechanical appliances, that those who entered school as deaf-mutes may be graduated as hard-of-hearing persons. Even where this result is unattainable, any hearing that exists (especially if it is sufficient for the pupil to hear his own voice) is a great aid in acquiring natural and agreeable speech — an acquisition that is almost impossible when the deafness is total. The semi-deaf, like the semi-mute, are sometimes exhibited to the public as deaf-mutes, and the speech of the semi-deaf and the language of the semi-mute are shown as the result of instruction given in the school. Much credit is often due to the school in both cases, but far more credit for the excellence of the speech is due to the partial hearing that the child possesses, and for the excellence of the language to the fact that it was acquired before hearing was lost. In justice to the real deaf-mutes, who are less favored by nature, and in the interest of truth, the existence of partial hearing and of speech naturally acquired ought always to be explained to visitors. The semi-deaf pupil may also be semi-mute; in that case he has a twofold advantage over his congenitally or quasi-congenitally and totally deaf classmate.

Causes of Deafness.— The division of the deaf into the congenitally and adventitiously deaf is an important one with respect to the causes of deafness. Congenital deafness is not always hereditary but heredity is probably its most frequent cause. For this cause to be effective it is not necessary that one or both of the parents should be deaf; though both parents may hear, the existence of deafness in other relatives, as grandparents and more remote ancestors, uncles and aunts, brothers and sisters and cousins, is an indication that the deafness is hereditary. Consanguineous marriages often result in deaf children and a large proportion of these children are congenitally deaf. In these cases the deafness is probably hereditary. It is not necessary to believe that consanguineous marriage in itself is a true cause of deafness, but a tendency to deafness exists in many families; when two members of such a family marry each other, that tendency is transmitted to their offspring with increased intensity and deafness is the result. Another frequent cause of congenital deafness, though one rarely found in the statistics of «assigned» causes, is constitutional syphilis. While this cause is prenatal, and the responsibility for its results rests directly upon one or both of the parents, the deafness is not to be classed as hereditary. Other non-hereditary causes of congenital deafness are probably alcoholism, tuberculosis, scrofula and other diseases in one or both of the parents, but it has not yet been determined how far these causes are effective. The causes of adventitious deafness are many and various. Even the pre-natal influences above mentioned that cause congenital deafness sometimes produce, or combine with other causes to produce, adventitious deafness. Accidents, such as concussion, falls, blows on the ear, etc., are responsible for some cases; but a large majority of the adventitiously deaf have lost their hearing from some disease. The diseases of childhood that most frequently cause deafness are scarlet fever, cerebro-spinal meningitis, brain fever, catarrh, measles and typhoid fever, in the order named.

History and Statistics.— The enumerators of the thirteenth census reported 44,519 «deaf and dumb» and 189 were subsequently added for good reasons in the office, making a total of 44,708 in the United States in 1910; but, as is stated in the preliminary bulletin of the Bureau published in 1915, «it was impossible to say just what this total represented; on the one hand it fell short in all probability of including all deaf-mutes, and on the other it included many who were not deaf-mutes at all.» Probably the actual number of the deaf in the United States exceeds the returns of the thirteenth census reports. The number of the deaf bears a certain relation to the population, being far greater in countries wherein squalor, privation, medical ignorance or unhygienic conditions prevail. The ratio of deaf-mutes to population is as follows, for the different countries named: Sardinia, 1 to 760; Nova Scotia, 1 to 880; Ireland and Norway, 1 to 970; France, 1 to 1,200; Prussia, 1 to 1,675; England, 1 to 1,970; Holland, 1 to

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Girolamo Cardano
(From an engraving by Gio. Pavesi, a pupil in the Royal Institution for Deaf Mutes, Milan, 1867.)

2,000; United States, 1 to 2,400. Whether deafness in the United States is increasing or diminishing it is impossible to say positively, for unhappily the decennial censuses of the deaf have not been taken upon a uniform plan and therefore do not afford an exact basis for comparison. According to the returns it appears to be diminishing, and the progress that has been made within recent years in the prevention and treatment of the diseases that cause adventitious deafness gives us reason to hope that this apparent diminution is real and that in the future such deafness will become more and more infrequent. Congenital deafness is more difficult to deal with; but this also appears to be diminishing, as it certainly ought to be. Syphilis is both preventable and curable; alcoholism is at least preventable; and now that the laws of heredity are becoming better understood there should be fewer marriages liable to result in deaf offspring. In antiquity and through the Middle Ages the condition of the deaf was deplorable. Belonging generally to the lower classes, ignorant, unable to understand the speech of others or to make themselves understood except by rude gestures, classed under the law with the idiotic and insane, popularly supposed to be possessed of a devil and so shunned as objects of contempt or superstitious dread, their lot, save in rare cases, must have been one of degradation and wretchedness and always of isolation and unhappiness. Girolamo Cardano, of Milan (1501–76), was the first to express the belief that the deaf could be educated. In «De Surditate» and «Paralipomenon» he not only declared that it was possible, though difficult, for deaf-mutes to learn to read and write, but also stated clearly the principle upon which their education depends; namely, that ideas can be associated with written words without the intervention of sound and so «the deaf-mute can hear by reading and speak by writing.» The seed sown by Cardano was slow in springing up and bearing fruit. In the great intellectual progress of the 16th and 17th centuries the deaf had but a scanty share. A few fortunate individuals among them were taught by Ponce, Bonet and Carrion in Spain; Wallis, Holder and Baker in England; Amman in Holland; Pasche, Kerger, Raphael and Lasius in Germany; Fay, Pereire and Vanin in France. Some of these teachers, especially Bonet, Wallis and Amman, and one who was not a teacher, Dalgarno in Scotland, published expositions of their methods. But it was not until the middle of the 18th century that the human conscience was aroused to the duty of educating the deaf generally. The first great impulse in this direction was given by the benevolent Abbé de l'Epée, whose school for the deaf, established at Paris about 1760, speedily became famous throughout Europe. At nearly the same time, independently of De l'Epée and of each other, schools were begun by Samuel Heincke in Dresden and Thomas Braidwood in Edinburgh. Similar schools soon followed in other countries and they have continued to increase to the present time. There are now about 670 schools for the deaf in the world.

Gallaudet College at Washington, D. C., was established in 1864 through the efforts of Edward Miner Gallaudet, who was its president from that date until 1910. It was named in honor of Thomas Hopkins Gallaudet, the founder of deaf-mute education in America. Congress has made liberal appropriations for

Statue of Thomas Hopkins Gallaudet, founder of Deaf-Mute Education in America, at Washington, D. C.
Daniel Chester French, Sculptor.

its grounds, buildings and support, and provides 100 free scholarships. It is the only institution in the world devoted to the higher education of the deaf. While it is possible for the deaf, with special help, to pursue courses of study in ordinary colleges, they can do so with much greater facility in Gallaudet College. Among its graduates are clergymen ministering to the deaf, editors, publishers, teachers, architects, artists, chemists and other specialists in science, successful business men, farmers, etc.

Among the Americans who have been especially associated with the education of the deaf may be named: Dr. F. A. P. Barnard of New York, William W. Turner of Hartford, Abraham B. Hutton of Philadelphia, John A. Jacobs of Kentucky, Harvey P. and Isaac L. Peet of New York, Edward and Thomas Gallaudet.

Notable cases of great proficiency among the deaf are those of Laura Bridgman, a celebrated blind deaf-mute and pupil of Dr. S. G. Howe, and Helen Keller of Boston, a lady of wide information and great intelligence.

Besides papers published at many of the residential schools, there are two American periodicals devoted to the education of the deaf, both published at Washington, D. C.: The *American Annals of the Deaf*, established in 1848, issued bi-monthly during the school year by the conference of superintendents and principals of American schools for the deaf, and the *Volta Review*, issued monthly by the Volta Bureau for the increase and diffusion of knowledge relating to the deaf, which was founded and endowed by Dr. Alexander Graham Bell in 1887. The work of this bureau is carried on by the American Association to promote the teaching of speech to the deaf, which was also endowed by Dr. Bell. Other important organizations working in the interests of the deaf are the convention of American instructors of the deaf, which meets triennially; the conference of superintendents and principals above mentioned; and the American Association of the Deaf, whose membership is composed of the educated deaf. One of the leading aims of this association of the deaf is to promote the combined system of instruction; another is to suppress the vagrant impostors who beg from the public on the pretext that they are deaf. As a matter of fact the really deaf are scarcely ever beggars.

Most of the larger cities in the United States have churches or missions for the deaf in which religious services are conducted in the sign language and much is done in various ways to promote the social enjoyment and material welfare of the adult deaf as well as their moral and religious culture. The Episcopal Church under the leadership of the Rev. Dr. Thomas Gallaudet, a son of Thomas Hopkins Gallaudet, was the pioneer in this work and still has the largest number of workers; but within recent years churches or missions have also been established by Methodists, Baptists, Presbyterians, Lutherans, Roman Catholics and Jews.

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EDWARD ALLEN FAY,
Editor ‘American Annals of the Deaf.’

DEAF, Education of the. The education of the deaf presents two fundamental problems. First, the problem of giving them an understanding of their native language. Second, the problem of teaching them to speak the language and to understand it when spoken by others. A deaf child may be taught to read and write the English language, and may be given a good education without ever learning to speak or to understand people when they speak. This result can be accomplished by the sole use of writing. It can be further facilitated by the employment of gestural signs and finger spelling. The child so taught gets mental development, knowledge and education.

For a long time that was all that was attempted by educators of the deaf. But to-day in every civilized country in the world some attention is being given to the additional problem of teaching the congenitally deaf to speak and to read the lips of speakers by sight. In many countries, including the United States, this improvement has gone so far that now a considerable part of all deaf pupils are taught exclusively by means of the speech method without any use whatever being made of the sign language or finger spelling.

The public education of the deaf in the United States began in 1817 in a small institution established in Hartford, Conn., through the interest and generosity of a few men, one of whom, Dr. Cogswell, had a deaf daughter, Alice. A young divinity student, Thomas Hopkins Gallaudet, became interested in this little girl, and in 1815 consented to go to England for the purpose of learning the method there employed of educating deaf children in order to use it in the institution it was proposed to establish in Hartford. The method was what is known as the speech or oral method, as distinguished from the silent, or manual, method. But the young Mr. Gallaudet found a curious situation in England. The education of the deaf there was at that time a monopoly in the hands of the Braidwood family, and the terms under which those in charge of the schools in London and Edinburgh were willing to permit Mr. Gallaudet to familiarize himself with their methods were such that he did not feel it possible to accept. When the young American emissary arrived in England, it chanced that the Abbé Sicard, a kindly French priest, who was continuing in Paris the work of educating deaf children by the silent or manual method begun by the Abbé de l'Epée, was in London, and met Mr. Gallaudet with much friendly interest, extending to him a cordial invitation to come to Paris and learn his method of instruction. After striving in vain for eight months to secure in England the knowledge he wished of the speech method of teaching the deaf, Mr. Gallaudet decided to accept the Abbé Sicard's invitation and went to Paris, where he was received with the greatest kindness. After a stay of three months, the Abbé consented to allow his best pupil, Clerc, to accompany Mr. Gallaudet to the United States. Therefore, it seemed wiser to return at once rather than to take the time to himself learn more fully the French silent method, since it could be efficiently inaugurated in collaboration with the deaf Clerc. The little school that was opened in Hartford in 1817 was, therefore, conducted by the silent method of signs and finger spelling then in vogue in France, instead of by the speech method as employed in England. Schools were from time to time established in other States, the first being in New York in 1818, until to-day each State has one or more. For 50 years all schools were modeled after the little institution in Hartford, and employed the silent method.

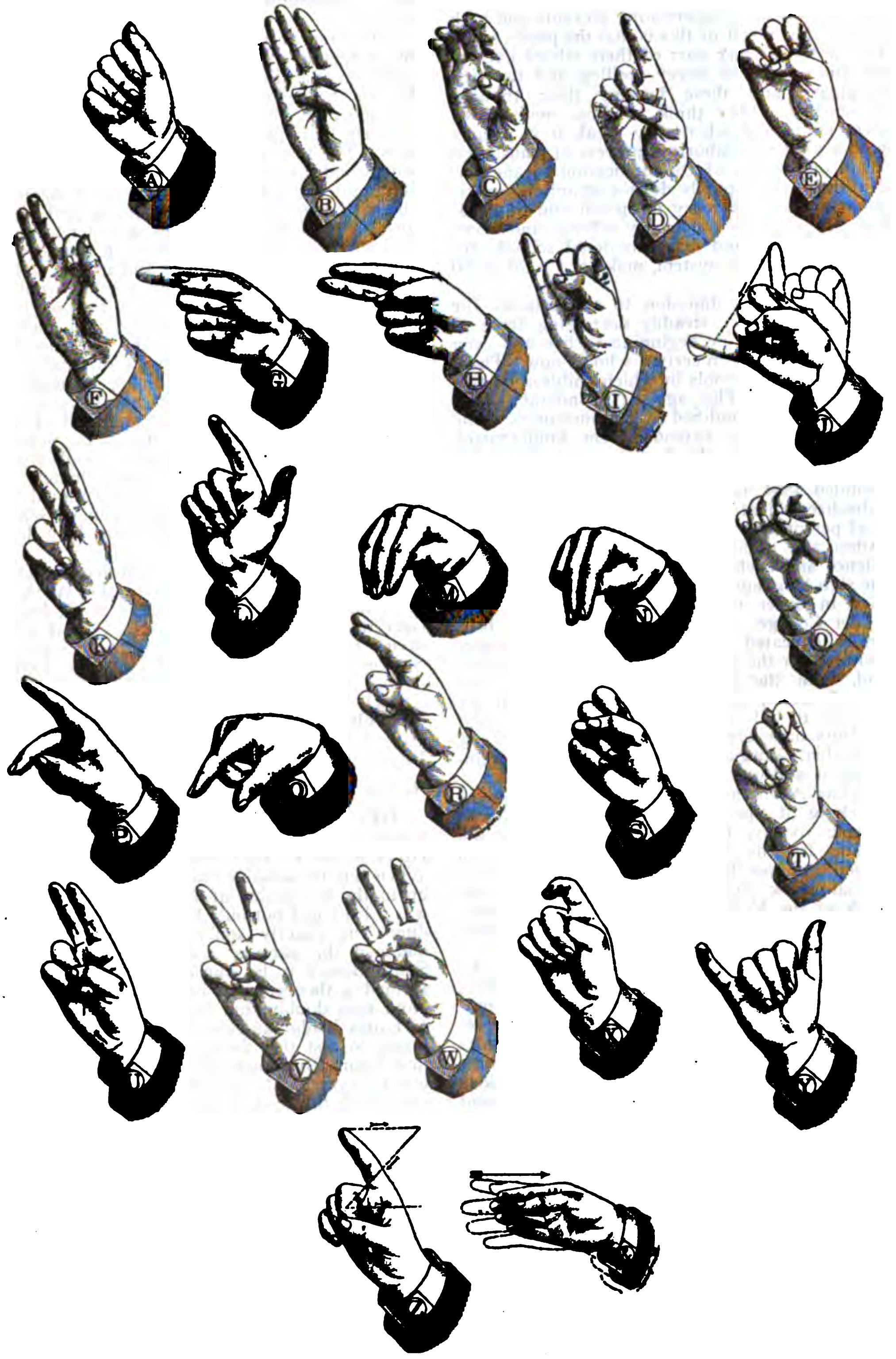
Statue of the Abbe De L'Epée. By Félix Martin.

The speech, or oral, method, used in England and in Germany, and later supplanting the silent method in France, did not gain a foothold in the United States for half a century. But in 1867 two little oral schools were established, one in New York and one in Massachusetts. In these schools no use was made of finger spelling or the sign langauge, all instruction, and all communication between pupil and teacher being by means of speech and writing. This method possesses many obvious advantages and, in spite of considerable opposition, made steady progress. During the half century from 1817 to 1867 little or no attention was given in the schools for the deaf in the United States to the teaching of their pupils to speak or to the preservation of the existing speech of those who had the misfortune to become deaf after speech had been acquired. The result was that not only did the congenitally deaf leave the schools truly deaf and dumb, but even those who had possessed speech up to 8 or 10 years of age lost it entirely, and went out into life dumb as well as deaf. With the establishment of the first oral schools in the United States, and the publicity that was given to their success in teaching even the congenitally deaf to speak, the older schools began to pay more attention to the matter of speech for their pupils.

The history of the progress of this speech branch of education in the United States has been that of increasing attention to the more normal treatment of the deaf during the educational period. The exclusion of the deaf from general intercourse with those about them, and the resultant segregation, are largely due to their dependence upon gestural signs and finger spelling with which very few hearing people are familiar. When they possess any ability to speak and to read the lips of those speaking to them, this isolation is greatly reduced. Fifty years ago the terms "deaf-mute" and "deaf and dumb" were correctly applied to almost all deaf persons whose deafness occurred before the 10th year of age. To-day, this name would be a misnomer in the cases of thousands of such persons because they have either been taught to speak or have had their early speech retained or restored.

The efficiency of the educational processes employed with the deaf has enormously increased during the past 100 years in every civilized country, but nowhere has there been greater progress than in the United States. The schools here are now the best equipped and the most lavishly maintained in the world. Not only do they provide the ordinary education of the public schools, but many of them give a thorough training in from 1 to 10 trades; each pupil being taught that means of livelihood to which he or she seems best adapted.

The last statistics (20 Oct. 1917) report the number of schools for the deaf in the United States as 157. Of these, 64 are public boarding schools, 73 public day schools and 20 private and denominational schools. The total number of pupils in attendance was 12,792. Total number of teachers 1,858. Total value of equipment of the public boarding schools $18,215,685. Thirteen of the public boarding schools were conducted on the pure oral plan, by which no teacher or other employee of the schools ever uses either finger spelling or the sign language in communicating with the pupils. Sixty-eight of the public day schools used this method, and 13 of the private and denominational schools, making a total of 94 schools conducted exclusively by the speech method. Forty-eight of the public boarding schools were conducted on what is known as the Combined system, which is a compromise between the silent method brought from France by Mr. Gallaudet and the speech method that reached this country half a century later. In the best of the Combined schools very little use is supposed to be made of either finger spelling or the sign language in the school rooms, but the pupils are instructed in these means of communication for use outside of



The American Manual Alphabet for the Deaf.

class rooms, in their intercourse with the teachers of industries, supervisors, servants and each other. The result of this is that the pupils spend by far the greater part of their school lives in an atmosphere of finger spelling and the sign language, and these become their thought vernacular. They think in these methods of expression, and when they speak it is usually with a somewhat laborious process of translation from one means of communication to another. Naturally these pupils do not attain the maximum average efficiency in speech and lip-reading. Five of the public day schools and seven of the private and denominational schools are conducted by this system, making a total of 60 combined schools.

The age of admission to the schools for the deaf has been steadily decreasing from 10 years of age at the beginning to five and even four years of age in certain schools now. There are also three schools in which children of two are received. The age of dismissal varies greatly, and is modified by circumstances. The course of study extends from kindergarten through the high school.

Gallaudet College, in the city of Washington, founded 1864, is an endowed and government subsidized institution for the deaf in which a deaf person may pursue a course of higher education and obtain the degrees of bachelor of science and bachelor of arts. A knowledge of the sign language and of finger spelling is necessary in order to pursue the courses at Gallaudet College. Most of those who have been orally educated who wish to take a college course enter the regular colleges and universities and, with the help of their classmates and special tutors, take the same courses that are offered to all students. In this way deaf students have obtained degrees from Harvard, Columbia, Georgia School of Technology, Johns Hopkins and other institutions.

«The American Association to Promote the Teaching of Speech to the Deaf» is a philanthropic society, incorporated in 1890, to aid schools for the deaf in their efforts to teach speech and speech reading. In addition to this special work the Association carries on the work of the Volta Bureau (q.v.) in Washington, D. C., an institution dealing more generally with the education of the deaf.

The State of New York provides for the payment of $300 a year to any deaf man who is a matriculated student in the recognized universities of the State. This money is to defray the expense of special readers and tutors to enable the deaf pupil to overcome to some extent his handicap. Recent investigations seem to show that something over 97 per cent of the graduates of schools for the deaf in the United States are self-supporting; also, that the earning power of those possessing some ability to speak and understand speech is greater than of those who must depend exclusively upon finger spelling and the sign language, or pencil and paper. The deaf are found in every conceivable occupation, but the majority of them earn a living in some one of the trades, especially printing, brick laying, painting and carpentering.

For educational purposes, the deaf fall naturally into three classes: (1) Those totally deaf from early infancy or birth; (2) Those partially deaf from birth or early infancy; (3) Those adventitiously deaf after speech has been acquired.

All three of these groups need to be given the ordinary common school education as a minimum educational equipment. In addition to this, in the case of each group, special attention must be given to certain other problems not met with in ordinary educational institutions. The first group must be taught to speak and to understand when spoken to by means of sight and in spite of the absence of hearing. The partial residual hearing of the second group must be developed and trained in order to make it of the utmost possible service in the acquisition of speech and language and in the understanding of what is said. The already acquired speech of the third group must be preserved and improved, and lip-reading by sight must be taught to supply the place of the lost power to comprehend by sound. These additional tasks superimposed upon the ordinary educational burdens of the school makes necessary in the schools for the deaf a higher standard of efficiency and effort than is found in the schools for the hearing. Otherwise these schools would not be able to accomplish in approximately the same length of time the same educational advancement that is attained in the ordinary school where the pupils are not handicapped by deafness.

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JOHN DUTTON WRIGHT,
Author of 'Educational Needs of the Deaf.'

DEAF-BLIND, The. «Obstacles are things to be overcome» is the motto given by Dr. Howe to the Perkins Institution for the Blind. When this remarkable man learned in 1837 that up in the mountains of New Hampshire there was a little girl not only blind but also deaf and dumb, he eagerly sought out the child and obtained the parents' consent to take her to South Boston to be educated. He had already formed a theory as to how he would reach a mind thus doubly shut in, and with the finding of Laura Bridgman came the wished-for opportunity to test this theory. It should be noted that Laura Bridgman saw and heard until she was two years old. She had been rather a delicate child, however, having enjoyed only about four months of robust health, when she sickened, her disease raging with great violence during five weeks, «when her eyes and ears were inflamed, suppurated and their contents were discharged.» Her sufferings continued for months, and it was not «until four years of age that the poor child's bodily health seemed restored.» She was intelligently active, following her mother about the house, seeming anxious to feel of everything, and thus to learn about it; and she developed signs for her father and her mother, and for some things.

She was eight years old when brought to the Perkins Institution. Dr. Howe writes: «There was one of two ways to be adopted: either to go on and build up a language of signs on the basis of the natural language, which she had already herself commenced, or to teach her the purely arbitrary language in common use; that is, to give her a sign for every individual thing, or to give her a knowledge of letters, by the combination of which she might express her idea of the existence, and the mode and condition of existence, of anything. The former would have been easy, but very ineffectual; the latter seemed very difficult, but, if accomplished, very effectual; I determined, therefore, to try the latter." After the child had become adjusted to the change of homes, Dr. Howe began teaching her by means of common articles with which she was familiar — spoons, forks, keys, etc., on which labels with their names printed in raised letters had been pasted. Similar detached labels were given her to feel. Her touch was acute enough, hence she was able to match labels, placing that for book on the book, etc. She did this easily and willingly because she received approbation for so doing; but the idea that the printed word stood for the name of the object had not entered her brain. Then other detached labels were cut up into their component letters. These her memory soon enabled her to build into wholes or the words she had felt. Such exercises continued for many weeks to be only a meaningless play to the poor child. The success had been "about as great as teaching a very knowing dog," when suddenly the idea flashed upon her that "Here was a way by which she herself could make up a sign for anything that was in her own mind, and show it to another mind, and at once her countenance lighted up with a human expression; it was no longer a dog or parrot — it was an immortal spirit, eagerly seizing upon a new link of union with other spirits! I could almost fix upon the moment when this truth dawned upon her mind, and spread its light to her countenance; I saw that the great obstacle was overcome, and that henceforward nothing but patient and persevering, plain and straightforward efforts were to be used." Next, she was given metal type each bearing some embossed letter, and a frame with holes to receive them. With this appliance Laura readily wrote the name of any object she knew and by writing them fixed in mind an extensive vocabulary of common names. Then the less cumbrous manual alphabet was taught her. Here was a means by which she could both write and read; she could spell to her teacher and read what her teacher spelled into her hand. Dr. Howe's reports teem with interesting psychologic material. At the end of the year he writes: "She is nine years of age, and yet her knowledge of language is not greater than a common child of three years. There has been no difficulty in communicating knowledge of facts, positive qualities of bodies, numbers, etc.; but the words expressive of them, which other children learn by hearing, as they learn to talk, must all be communicated to Laura by a circuitous and tedious method. In all the knowledge which is acquired by the perceptive faculties, she is of course backward; because, previous to her coming here, her perceptive faculties were probably less exercised in one week than those of common children are in one hour." And so her instruction went on. Through it all the child showed an eagerness to learn and to put herself in touch with the world that was a powerful aid to the teacher. In a few years, when Oliver Caswell, also deaf, dumb and blind, came to the institution, Laura naturally took great interest in teaching him, and thereby profited much herself. As she approached womanhood her education was already good. She had learned to sew, to knit, and to do fancy work. She often visited her home, but her true home was the institution; there she died in her 60th year, the first case of any one so afflicted made capable of leading an industrious and happy life, and as the first case, historically the most remarkable. Popular interest in Laura Bridgman, both in this country and abroad, was naturally very great. The printed reports of her progress which were eagerly awaited were as eagerly absorbed. Distinguished foreigners coming to Boston visited her. Charles Dickens wrote in his American notes a sympathetic account of his impressions of her. The way to give liberty to the imprisoned mind had been made plain.

In the year 1887 something like the old interest was aroused by accounts of the brilliant deaf, dumb and blind child in Alabama, Helen Keller. This child had lost sight and hearing at 19 months as a result of a serious illness. Like Laura she kept actively interested in all that surrounded her, and like Laura she developed her own little language of signs. When she was six years old, her friends, who knew of Laura Bridgman's case, applied to Boston for a teacher. In the following year Miss Annie M. Sullivan was sent. This lady was able to put herself in touch with Helen in a very short time and in a marvelous way. In fact, she has proved herself to be a most remarkable teacher. Following in general the methods adopted in teaching Laura, Miss Sullivan began her work by putting Helen in possession of the manual alphabet. A doll was happily chosen to begin with; and with the doll on the child's lap, the teacher formed in Helen's hand the finger letters *d-o-l-l*. Other familiar objects were similarly introduced, and strange as it may seem, that which had taken three months to reach in Laura's case in Helen's took but a few days; or, in Miss Sullivan's words, "it was not more than a week before she understood that all things were thus identified." Her teacher writes: "Never did a child apply herself more joyfully to any task than did Helen to the acquisition of new words. In a few days she had mastered the manual alphabet and learned upward of 100 names." After teaching verbs and prepositions through action and position Miss Sullivan made a departure. She began to use new words in connection with old words, letting Helen understand them if possible from the context. The child adopted these words "often without inquiry." In this way she became familiar with the use of many words whose meaning never had to be explained to her.

As to the letters of the raised alphabet, Miss Sullivan writes: "Incredible as it may seem, she learned all the letters both capital and small in one day." Then came the primer; then pencil writing than which there is scarcely a more difficult exercise for the blind to learn; and yet Helen "wrote without assistance a correctly spelled and legible letter to one of her cousins; and this was only a little more than a month after her first lesson in chirography." Braille, or tangible point writing, became a constant delight to her.

Words like «perhaps» and «suppose» and those indicative of abstract ideas she learned more through association and repetition than through any explanation of her teacher. The child had the language sense largely developed. Much of the time when no one was talking with her she was reading in books printed in raised letters. Dr. Bell in trying to account for Helen's wonderful familiarity with idiomatic English, considers of great significance the statement of Miss Sullivan, that «long before she could read them [the books] . . . she would amuse herself for hours each day in carefully passing her fingers over the words, searching for such words as she knew.» In 1888, when Helen was eight years old her teacher took her to South Boston, where she could have the advantage of all the appliances and embossed books that a school for the blind affords. Thenceforth an account of her progress reads like a romance. It was no more difficult for her to learn a new word in German or in Greek than in English; and she took great delight in picking up and using French or Greek phrases. And when later she came to study these languages, she seemed to advance without effort in the knowledge of them. The educators of the deaf, who have good reason to comprehend the exceeding difficulty of teaching their pupils to articulate intelligibly, feel that Helen Keller's rapid mastery of speech is by all odds her most wonderful achievement. After she had been in South Boston some little time she heard of a Swedish girl afflicted like herself, who had learned to speak, and she said, «I must learn to speak.» Miss Sullivan took her to Miss Sarah Fuller, principal of the Horace Mann School for the Deaf, and though Helen's only means of learning the position of the vocal organs in speech was to put her fingers on the lips, tongue, teeth and throat of the speaker, she learned in 10 lessons to articulate so well that she could carry on an intelligible and audible conversation, having communication addressed to her spelled into her hand by the manual alphabet. She has learned since that time to read from the lips and throat of a speaker by placing her fingers lightly on them; so that any one sitting near her can converse with her just as though she could both hear and see. She spent a winter at the Wright-Humason Private School for the Deaf, where she improved her articulation. When Helen was 16 years old she entered the Cambridge School for Girls, Miss Sullivan accompanying her. There, under the guidance of Mr. Arthur Gilman, the director of the school, she took the course preparatory to entering Radcliffe College. At the end of one year she took the regular required examinations in the history of Greece and Rome, in English, in Latin, in elementary French, in elementary German and in advanced German. As the questions and other matter were read into her hand by Mr. Gilman himself, Helen wrote her answers and translations on an ordinary typewriter. She passed the tests in every subject, taking «honors» in English and German. Mr. Gilman writes: «I think that I may say that no candidate in Harvard or Radcliffe College was graded higher than Helen in English.» She entered Radcliffe in 1900 and was graduated from it in due course in 1904, receiving her A.B. «cum laude» or with distinction. Miss Sullivan remained with her throughout, acting everywhere as interpreter. Miss Keller still lives with this faithful friend who is now Mrs. Macy. She spends much time reading and writing and studying; in fact she is essentially a student and a thinker and is not, as is often hinted, dependent for ideas upon those about her. Neither is she merely intellectual, being unusually capable in the practical affairs of the household. She has a very normal interest in her personal appearance and has cultivated a charming social personality.

Miss Keller has been able to be personally serviceable to those shut in like herself, especially to the blind. Her great heart throbs in behalf of all suffering humanity; hence, her interest in socialism, the red flag of which means to her only warmth and universal fair play. Desiring to add to her earnings through lecturing, she has now had her speaking voice strengthened and improved in quality under the devoted instruction of Mr. Charles White of the New England Conservatory of Music. Since 1912 she has often appeared on the public platform, speaking with evident effect to many thousands of people in different States of the Union. Her autobiography, 'The Story of My Life' and other of her writings have been translated into several languages. People who have visited Miss Keller in her home, sometimes doubting the truth of the unique accomplishments of this deaf-blind woman,— and indeed impossible and ridiculous things have been attributed to her — these visitors have invariably gone away convinced that Helen Keller represents, as indeed she does, one of the greatest achievements of objective love and subjective will known to education. Her career has exerted a profound influence upon the aspirations of humanity. The literature of the subject, which is very large, has been collected in two special libraries where it may be consulted, namely, at the Perkins Institution, Watertown, Mass., and at the Volta Bureau, Washington, D. C.

The other deaf-blind children who have come under instruction have been or are some at schools for the blind, some at schools for the deaf. They must always have a special teacher and use embossed books and adapted appliances. All have been or are being taught on principles employed in teaching Laura Bridgman and Helen Keller. At the Perkins Institution they attend classes with other pupils, the special teacher acting simply as interpreter and companion.

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and After Care of the Deaf-Blind‹ (London 1914).

EDWARD E. ALLEN,
Director of Perkins Institution and Massachusetts School for the Blind.

DEAFNESS, a condition in which there is loss of hearing, partial or complete, due to disturbance or destruction of some part of the hearing apparatus, either external or internal. See DEAF, THE; EAR.

DEÁK, dā-āk, **Ferencz**, Hungarian statesman: b. Söjtör, Zala, Hungary, 17 Oct. 1803; d. Budapest, 29 Jan. 1876. Having studied law at Raab, he practised for some time as a barrister, but his political career began with his election to the National Diet in 1832. He soon became, in spite of his loyalist and conservative tendencies, a prominent member of the liberal opposition. He was particularly desirous of preserving Hungarian nationality intact and of improving internal conditions. At the revolution of 1848 he became Minister of Justice under Count Batthyányi and advanced a scheme for the reorganization of the administration of justice which did not materialize owing to the pressure of events. He spent great efforts in attempting to avoid the break with Austria, and retired when the Committee of Defense was formed and Kossuth obtained power. He tried to negotiate peace with the Austrian commander in 1848, but terms could not be agreed upon. On the defeat of the patriots in 1849 he retired from public office and did not return till 1860. He led the Diet of 1861, where he formulated the address to the emperor stating the Hungarian demands for constitutional rights. The Diet was immediately dissolved by the emperor, but Deák did not give up the project. It was not until after the war between Austria and Prussia that these demands were granted and Deák's hopes for a dualistic constitutional monarchy were realized. Deák refused to accept any honors, but remained in the Diet until his death, working patiently and consistently for the unity of Hungary and jealously guarding its rights and liberties. Great praise has been given him for his generosity, simplicity and sincere patriotism. His statesmanship was marked by clarity of vision and lofty unselfish devotion to his country. Consult Forster, ‹Francis Deák, Hungarian Statesman› (London 1880); Ferenczi, Z., ‹Life of Deák› (Budapest 1894, in Hungarian); Csengery, ‹Franz Deák› (translated into German by Heinrich, Leipzig 1877–78).

DEAKIN, Alfred, Australian statesman: b. near Melbourne, Victoria, 3 Aug. 1856. He was educated at Melbourne University; was Minister of Public Works and Water Supply 1883–86; Solicitor-General 1885; Chief Secretary 1886–90; Member of Federal Council 1889–95, 1897–99; Attorney-General of the Commonwealth of Australia 1901–03; and Prime Minister 1903–04 and 1905–08. He has published ‹Irrigation in Western America› (1885); ‹Irrigation in Egypt and Italy› (1887); ‹Irrigated India› (1892); ‹Irrigation in Australia› (1893); ‹Temple and Tomb› (1894).

DEAL, in the United States, a plank 12 feet long, 11 inches wide, and 2½ inches thick. Deals are sawed of other sizes, but are reduced to that cubic dimension in computing them. The name deal is applied in Europe to boards of fir above seven inches in width and of various lengths exceeding six feet. If seven inches or less wide they are called battens, and when under six feet long they are called deal-ends. The usual thickness is three inches and width nine inches. The standard size, to which other sizes may be reduced, is one and one-half inch thick, 11 inches broad and 12 feet long. Whole deal is deal which is one and one-half inch thick; slit deal, half that thickness. Deals are exported from many parts of Europe and the American continent. In the timber trade 50 cubic feet of deals are a load, and 100 feet superficial are a square.

DEALFISH, deep-sea bony fishes of the family *Trachypteridæ*, allied to the oar-fish and the ribbon-fish (q.v.). As the name suggests, the elongated body is laterally compressed, and with the exception of a small separate elevated anterior portion, the dorsal fin is continuous along the back. The anal fin is absent. The tail-fin is peculiar in being sharply turned upward. The skeleton is very fragile. Some eight species are known from specimens accidentally thrown ashore on European coasts and from the west of South America.

DE AMICIS, Edmondo. See AMICIS, EDMONDO DE.

DEAN, Amos, American jurist: b. Barnard, Vt., 16 Jan. 1803; d. Albany, N. Y., 26 Jan. 1868. He early acquired eminence in his profession and after being professor of medical jurisprudence in the Albany Medical School and of law in the Albany Law School, became chancellor of the University of Iowa in 1855. Among his published works are ‹Lectures on Phrenology›; ‹Manual of Law› (1838); ‹Medical Jurisprudence› (1854); ‹Bryant and Stratton's Commercial Law› (1861); ‹History of Civilization› (1869–70); ‹The British Constitution› (1883).

DEAN, Bashford, American zoologist: b. New York, 28 Oct. 1867. He was educated at the College of the City of New York and at Columbia University. He was instructor in biology at Columbia after 1891 and has been professor of vertebrate zoölogy there since 1904. He also served as biologist and special investigator of the United States Fish Commission in 1900–01. He became member of the advisory board of the New York aquarium in 1902 and in 1903 curator of herpetology and ichthyology at the American Museum of Natural History, and curator of arms and armor at the Metropolitan Museum of Art in the same year. He is author of ‹Fishes, Living and Fossil› (1895) and of numerous papers in palæichthyology and embryology of fishes, besides a number of articles on arms and armor.

DEAN, John Ward, American author and genealogist: b. Wiscasset, Me., 13 March 1815; d. Medford, Mass., 22 Jan. 1902. He was educated in the public schools of Portland, Me., learned the bookbinding trade and conducted a bookbinding business in Boston for many years, till his appointment in 1872 as librarian of the New England Historic Genealogical Society. Except from 1889 to 1893 he filled this position until his death. He was editor of the *New England Historical and Genealogical Register*, and of nine volumes of the ‹New England Bibliopolist› (1880–98). Among his writings are numerous biographical memoirs, including the 'Memoir of Nathaniel Ward' (1868); 'Memoir of Michael Wigglesworth' (1871) and the 'Story of the Embarkation of Cromwell and his Friends for New England.'

DEAN, in ecclesiastical language, a church dignitary presiding over the chapter of a cathedral. The word is from the French *doyen* and from the Latin *decanus,* one set over 10 (Gr. *deka,* Lat. *decem,* 10). Originally *decanus* was the designation of a petty civil functionary: its ecclesiastical use had its rise in monachism, where a *decanus* was named to be chief and monitor of 10 monks or 10 hermits; and the senior *decanus* of a *cœnobium* served as head of the monastic community in the absence of the abbot. From the institution of canons regular, serving in the chapters of cathedral churches, came the usage of naming the chief among the canons of a chapter as its dean. Rural deans are parish priests who, appointed by the bishop, exercise a certain jurisdiction and supervision over the churches or congregations and their rectors within a definite district in a diocese. In the Curia Romana, the dignitary styled Cardinal Dean of the Sacred College is the chief among the cardinals and is usually the oldest of the seven cardinal bishops: he succeeds his predecessor in the see of Ostia. From ecclesiastical usage the term dean was adopted as designation of the leading member of various secular bodies, for example, the head of a university faculty, or a college, or of a guild. The deans in German cathedrals are subordinate to the provosts; they are appointed by the bishop usually, but sometimes by a sovereign or chapter. In the Church of England some of the deaneries are valuable benefices. A dean may hold one other living along with his deanery. He is bound to reside eight months of the year at his cathedral. The bishop of London holds the honorary office of dean of the chapel royal, and there is also a sub-dean and chaplains. Rural deans are beneficed clergymen appointed by the bishop or archdeacon to exercise jurisdiction in certain matters in some part of the diocese. This office had fallen into disuse, being superseded by the appointment of archdeacons, but has latterly been revived. The rural deans hold office during the life of those by whom they are appointed. There are also a few deans called deans of peculiars, who exercise an independent jurisdiction, and are not under a bishop. In Scotland the honorary title of dean of the chapel royal is bestowed on a clergyman of the established church, and six chaplains are also appointed to a similar honorary office. Deans of colleges are, in English universities, officers appointed to superintend the behavior of the members, and to enforce discipline. In the universities of Scotland and elsewhere the head of each of the faculties of law, theology, medicine, science, etc., is called dean of the faculty. In universities in the United States the dean of a department is the registrar or secretary, and in some institutions he has considerable to do with the discipline. The dean of guild in Scotland is a burgh official whose duty it is to see that buildings are erected in accordance with the municipal regulations.

DEANE, Charles, American antiquarian: b. Biddeford, Me., 10 Nov. 1813; d. Cambridge, Mass., 13 Nov. 1889. He was for many years a merchant in Boston but retired from business in 1864 and devoted himself to the collection of works relating to American history. He edited 'Bradford's History of Plymouth Plantation' (1856); 'Wingfield's Discourse of Virginia' (1860) and John Smith's 'True Relation.'

DEANE, Silas, American diplomatist: b. Groton, Conn., 24 Dec. 1737; d. Deal, England, 23 Aug. 1789. He was graduated at Yale College in 1758, and was a member of the first Continental Congress in 1774. He was sent by Congress to France as a political and financial agent, with instructions to ascertain the temper of the French government concerning the rupture with Great Britain, and to obtain supplies of military stores. But he did not confine himself to his instructions, and made promises and engagements on all sides, which afterward brought the Congress into considerable embarrassment. When it was determined to send ministers to negotiate treaties, Dr. Franklin and Arthur Lee were commissioned to join him at Paris, and he assisted in the negotiation of the treaty with France. In consequence of the extravagant contracts he had entered into, he was recalled 21 Nov. 1777, and John Adams appointed in his place. He left Paris 1 April 1778, and upon his return, being called upon to give an account of his proceedings on the floor of Congress, evaded a complete disclosure on the ground that his papers were in Europe. He then attacked his fellow commissioners and Congress itself in a public manifesto for the manner in which he had been treated, but did not succeed in removing the public suspicion from himself. Later his lack of sympathy with the American Revolution increased the animosity of his fellow citizens. He afterward published in 1784 'An Address to the Free and Independent Citizens of the United States' on the same subject, and returning to Europe, died in great poverty. It was not until 1842 that Congress succeeded in adjusting his case and discovered its financial indebtedness to the supposed mismanagement of Deane. About $35,000 was subsequently paid to his heirs. Consult Ingraham, E. D. (editor), 'Papers in Relation to the Case of Silas Deane' (1855); Clark, George Larkin, 'Silas Deane, a Connecticut Leader in the American Revolution' (New York 1913).

DEANS, Jeanie, the heroine of Sir Walter Scott's tale, 'The Heart of Midlothian.' When her sister Effie was sentenced to death for the murder of her own child, Jeanie went on foot to London and obtained from the queen a pardon for her sister. Her devotion forms a contrast to the attitude of the father, David Deans, whose rigid sense of justice leads him, in spite of the dictates of his heart, to drive Effie from his door. Effie is married to her lover and becomes a lady of the court.

DEARBORN, Henry, American soldier: b. Hampton, N. H., March 1751; d. Roxbury, Mass., 6 June 1829. He was practising medicine at Portsmouth when, on hearing the news of the battle of Lexington, 20 April 1775, he immediately marched with 60 volunteers, and was at Cambridge early the next day, a distance of 65 miles. He was made a captain, was at the battle of Bunker Hill 17 June, and accompanied Arnold on the expedition through the woods of Maine to Quebec. He served as major under Gates at the capture of Burgoyne, and distinguished himself and his regiment by a gallant charge at the battle of Monmouth in 1778. In 1779 he served in Sullivan's expedition against the Indians, in 1780 with the army of New Jersey, in 1781 at Yorktown, and in 1782 was on garrison duty at Saratoga. He was twice member of Congress, and for eight years, during the presidency of Mr. Jefferson, Secretary of War. In 1809 he was made collector of Boston, and on 27 Jan. 1812, became senior major-general in the United States army. Resigning his commission in the army in 1815, he was appointed, 7 May 1822, Minister to Portugal, where he remained two years, and was recalled at his own request.

DEATH, in common language, a state opposed to life, and considered as the cessation of it. Strictly speaking, we can trace only the cessation of organic life. The matter of which the body is composed does not perish on the death of an organized being; it undergoes various changes, which are known by the names of decay and putrefaction, and which are the preparation for its becoming subservient to new forms of life. What becomes of the mind, or thinking principle, whether in man or animal, after death, is a matter of philosophical conjecture or religious faith. The investigations of science do not throw the least light upon it. The change here adverted to, which is called death, does not take place so quickly as is generally believed. It is usually preceded and caused by disease or the natural decay of old age. The state called death takes place suddenly only when the heart or the brain is injured in certain parts. Probably the brain and the heart are the parts from which, properly speaking, death proceeds; but as the cessation of their functions is not so obvious as the cessation of the breath, which depends on them, the latter event is generally considered as indicating the moment when death takes place. In the organs of sense and motion the consequences of death first become apparent; the muscles become stiff; coldness and paleness spread over the whole body; the eye loses its brightness, the flesh its elasticity; yet it is not perfectly safe to conclude, from these circumstances, that death has taken place in any given case, because experience shows that there may be from certain causes a state of apparent death, in which all these circumstances may concur without the extinction of the vital spark. The beginning of putrefaction, in ordinary cases, affords the first certain evidence of death. Putrefaction begins in the bowels and genitals, which swell, become soft and loose, and change color; the skin also begins to change, and becomes red in various places; blisters show themselves; the blood becomes more fluid, and discharges itself from the mouth, nose, ears, eyes and anus. By degrees, also, the other parts are decomposed, and, last of all the teeth and bones. In the beginning of decomposition nitrogen and ammonia are produced: in the progress of it; hydrogen, compounded with carbon, sulphur and phosphorus, is the pevailing product, which causes an offensive smell, and the light which is sometimes observed about putrefying bodies. At last, only carbonic acid gas is produced, and the putrefying body then smells like earth newly dug. A fat, greasy earth remains, and a slimy soap-like substance, which mixes with the ground, and contributes with the preceding decompositions to the fertility of it. Even in these remains of organized existence organic life is not entirely extinct; and they contribute to produce new vegetable and animal structures. Putrefaction is much influenced by external circumstances, particularly air, heat and water. When the body is protected from the action of such agents it changes into adipocere; but this process requires a much longer time than common putrefaction. In very dry situations the body is converted into a mummy, in which state bodies are found in the arid deserts of Africa, and on the mountains in Peru. Some vaults are remarkable for preserving corpses from putrefaction. It is well known to every reader that particular substances counteract putrefaction; for instance, those used in tanning and in embalming mummies.

The death-agony is the state which immediately precedes death, and in which life and death are considered as struggling with each other. This state differs according to the cause producing it. Sometimes it is a complete exhaustion; sometimes a violent struggle, and very irregular activity, which at last, after a short pause, terminates in death. In some cases consciousness is extinguished long before death arrives; in other cases it continues during the whole period and terminates only with life. The person in this condition has already somewhat the appearance of a corpse: the face is pale and sallow, the eyes are sunken, the skin of the forehead is tense, the nose pointed and white, the ears are relaxed and the temples fallen in; a clammy sweat covers the forehead and the extremities, the alvine discharges and that of the urine take place involuntarily, the respiration becomes rattling, interrupted and at length ceases entirely. At this moment death is considered to take place. This state is of very variable length; sometimes continuing for minutes only, sometimes for days. When the patient is in this condition nothing should be attempted but to comfort and soothe him. As long as the dying person is able to swallow, wine or other cordials may be given from time to time.

Signs of Death.— During death the chief physical processes, such as respiration and circulation, may first cease, but molecular activity may persist for some time, as is evidenced in the common observation of the growth of hair after death. The desirability of knowing the absolute signs of death is due not so much to the danger of burying the living, as to the possibility that efforts at resuscitation may not be adequately performed in cases of apparent death. The idea that at the present time people can be buried alive is more or less absurd; but it is very true that many cases of apparent asphyxia, notably following drowning or electrical shock, are recoverable if proper means are taken.

There are a number of conditions that simulate death. The commonest of these are catalepsy and trance states, partial asphyxia and syncope or fainting. In catalepsy there is usually a loss of consciousness, the muscles of the body generally become very rigid, but the limbs may be readily moved and placed in various positions. The temperature is lowered, but the respiration and the heart-action, while reduced, are apparent. In trance the appearance of death is much more striking, consciousness is usually abolished, the face is pale, the limbs may be flaccid, and sometimes are rigid, the reflexes may be lost, and the pupils may be dilated and immobile. The absence of the signs of decomposition, the normal ophthalmoscopic appearance of the fundus of the eye, and the persistence of electrical excitability are sufficient, however, for determining this condition. Partial asphyxia by drowning is one of the most frequent causes of apparent death. Resuscitation has resulted even after a body has been under water for an hour. This fact emphasizes the desirability of continued treatment in all cases of asphyxia by drowning. Ordinary fainting is readily distinguished from normal death.

The special signs of death are those that involve the circulation, respiration, conditions of the muscular system and certain changes in the eye. Circulatory changes are those of stoppage of the heart, with consequent loss of heat and coagulation of the blood. Careful listening to the heart-sounds by means of specially devised instruments may be necessary to determine whether the heart has stopped beating or not, and special methods of applying ligatures to the lobe of the ear or the finger, cutting off the venous return and permitting the ordinary inflow to continue, may be used. The respiratory changes consist of cessation of respiration, with consequent change in the color of the patient, there being marked pallor in distinction usually to marked cyanosis of asphyxia. A mirror placed before the nose or over the mouth will sometimes detect breathing when it cannot be seen or heard; and if a vessel of water be placed over the chest, movements of that organ may be detected. Muscular changes are very characteristic. There is usually complete muscular relaxation, followed by great stiffness (*rigor mortis*) after a certain number of hours. There is commonly loss of excitability of the muscles. Changes in the eye are corroborative rather than unique. The iris is usually flaccid; the pupil is ordinarily moderately dilated and irresponsive to light, and is not reacted upon by atropine or eserine half an hour after death. There is a marked anæmia of the fundus of the eye when viewed with the ophthalmoscope.

Finally there are a series of cadaveric changes that result and which are indubitable evidence of death. There is gradual loss of heat, although in certain cases of cholera temperatures as low as 76° F. have been observed, and the patient has still lived. *Rigor mortis* develops, probably, by the action of a ferment resulting in the formation of myosin. This condition may come on very rapidly, sometimes in a few hours, but complete *rigor mortis* rarely takes place within this time. Occasionally there is an instantaneous *rigor mortis*, when death occurs suddenly during violent muscular exertion. This happens in times of war, when weapons are sometimes firmly grasped in the dead hand; and in some cases of drowning the patients may be found with weeds and mud clutched in the fingers. The disappearance of *rigor mortis* usually takes place in from 16 to 36 hours, although there is no absolute rule. Coagulation of the blood, post-mortem hypostases, post-mortem lividities and putrefactive decoloration, with formation of gases, are usually characteristic and unequivocal.

Death in Mythology, etc.— The representation of death among nations in their earlier stages depends upon the ideas which they form of the state of man after this life, and of the disposition of their gods toward mankind. In this respect the study of these representations is very interesting. Of later ages the same cannot be said, because imitations of representations previously adopted are very often the subjects of the plastic arts in such periods. However, these representations do not altogether depend on the causes above mentioned, as the general disposition of a nation (for instance, that of the Greeks, who beautified every object) has also a great influence upon them. The Greeks represented death as a pleasing, gentle being, a beautiful youth. They personified death under the name Thanatos, while the Kēres were rather the goddesses of fate and violent deaths, like the Valkyrie in the northern mythology. According to Homer, Sleep and Death are twins, and Hesiod calls them the sons of Night. They are often portrayed together on cameos, etc. During the most flourishing period of the arts Death was represented on tombs as a friendly genius with an inverted torch, and holding a wreath in his hand; or as a sleeping child, winged, with an inverted torch resting on his wreath. Sleep was represented in the same manner, except that the torch and wreath were omitted. According to an idea originating in the East, death in the bloom of youth was attributed to the attachment of some particular deity, who snatched his favorite to a better world. It was ascribed, for instance, to Jupiter, or to his eagle, if the death was occasioned by lightning; to the water-nymphs if the individual was drowned, as in the case of Hylas; to Eos or Aurora if the death happened in the morning; to Selene, if at night, etc. These representations were more adapted to relieve the minds of surviving friends than the pictures of horror drawn by later poets and artists. (Consult Herder's 'Wie die Alten den Tod gebildet.') Euripides, in his 'Alcestis,' even introduced Death on the stage, in a black robe, with a steel instrument in his hand, to cut off the hair of his victims, and thus devote them to the infernal gods. The later Roman poets represent Death under more horrible forms, gnashing his teeth and marking his victims with bloody nails, a monster overshadowing whole fields of battle. The Hebrews, likewise, had a fearful angel of death, called Samaël, and prince of the world, and coinciding with the devil; but he removes with a kiss those who die in early youth. The disgusting representations of Death common among Christians originated in the 14th century; for the representation of Death as a skeleton merely covered with skin, on the monument at Cumæ, was only an exception to the figure commonly ascribed to him among the ancients. In recent times Death has again been represented as a beautiful youth — certainly a more Christian image than the skeleton with the scythe. The monument made by Canova, which George IV erected in honor of the Stuarts in Saint Peter's Church at Rome, represents Death as a beautiful youth. He is sometimes portrayed under the figure of a dying lion.

Causes of Death.— There are 15 principal causes of death, with the rate per 100,000, as given by the census bureau. They are as follows: Pneumonia, 191.9; consumption, 191.5; heart disease, 134; diarrhœal diseases, 85.1; kidney diseases, 88.7; apoplexy, 66.6; cancer, 60;

old age, 54; bronchitis, 48.3; cholera infantum, 47.8; debility, 45.5; inflammation of brain and meninx 41.8; diphtheria, 34.4; typhoid, 33.8; and premature birth, 33.7. Death from all principal causes shows a decrease during the last two decades, the most notable instance being that of consumption, which shows a decrease of over 50 per cent per 100,000. The world's death rate is estimated at 68 a minute, 97,920 a day, and 35,740,800 a year.

Bibliography.— Alden, H. M., 'A Study of Death' (New York 1903); Carrington, H. and Meader, J. R., 'Death: Its Causes and Phenomena' (New York 1912); Gasser, H., 'The Evolution of Death' (Chicago 1902); Leadbeath, C. W., 'The Other Side of Death' (Chicago 1903).

DEATH, Civil; in English law, formerly the entire loss or forfeiture of civil rights, which followed on attainture for treason or felony. A man was considered civilly dead who retired into a monastery or abjured the realm. By Act 33 and 34 Vict. cap. xxiii a conviction for treason or felony no longer causes attainder or forfeiture of civil rights. In the strict sense, the term has never been used in the United States.

DEATH, Dance of. See DANCE OF DEATH.

DEATH-ADDER (*Acanthophis antarcticus*), a very venomous and justly feared snake of Australia, which also occurs throughout the Indo-Malayan Islands to the Moluccas. It belongs to the *Elapidæ*, of which the cobra is also a member, but the death-adder lacks the spreading "hood." The end of the tail is flattened laterally, and is terminated by a horny spine, anterior to which are several rows of enlarged scales.

DEATH-SONG. It was the pride of the ancient man to depart from life exulting in his victories and defying his enemies. There are traces of death-songs in many languages and among many peoples. The custom has been in vogue especially among some of the tribes of American Indians. The dying chief chanted all the warlike deeds of his life, gloating in his victories over his foes. It is sometimes called the swan-song because of the legend that the dying swan after a long life approaches its end and at the last moment is given the power of sweet song. The Christian believes in a happy deathbed. John Wesley proudly said on one occasion "Our people die well."

DEATH-TICK (*Clothilla pulsatoria*), a neuropterous insect of the family *Psocidæ*, of the size and appearance of the common plant-louse, one species of which is a visitor of gardens. Another species is the little book-louse found running over books and feeding on the paper. In England it is called "death watch," because there it is said to make a ticking sound like that of the beetle (*Anobium*), thus exciting many superstitious notions. See DEATH-WATCH.

DEATH VALLEY, Cal., a low desert in Inyo County, near the Nevada border. The name of this region was given by a survivor of an emigrant party of 30 who, in 1849 or 1850, lost their way here, and of whom, after enduring indescribable sufferings, 18 perished in the sands. No other such spot is known. Like all the great valleys of California, it lies oblong from north to south. Its length is about 150 miles; width varies from 10 to 35; surface about 210 feet lower than that of the ocean, the lowest point of dry land in the United States. It is interesting to note that Mount Whitney, the highest point in the United States (14,501 feet), lies at a distance of less than 80 miles from the point of lowest depression. The Panamint Mountains shut out from it the moist winds of the Pacific. In the August atmosphere there is less than one-half of 1 per cent of moisture. The surrounding country is made up of volcanic ranges — black, red, green, yellow and brown — which have furnished the valley with the borax now found there.

On the north of the valley is Ralston Desert, on the west Panamint Desert, on the south Mojave Desert and Amargosa Desert is on the east. Death Valley has the lowest depression. Summer heat here rises to 137° F. or more, far higher than anywhere else in the Western world. Death Valley, as seen from the summit of the Panamint Range, presents in November a long gray waste desert, in which there are narrow bands of white made by thin deposits of borax; and to the south is seen a thin line like a blade of steel — the Amargosa River, as it dies away upon entering Death Valley sink. It is a sluggish, dead stream, and evaporation and absorption at last take it all. The land was once the centre of a system of lakes. Toward their summit, the Panamint Mountains are of carboniferous limestone formation, rifted and worn, with a very slight growth of piñon, pine, mahogany and juniper, near the crests; and below the vegetation becomes more scant. In the gorges and narrow cañons are seen numerous vines and creepers, on which grow wild gourds resembling oranges, also similar to the bitter desert apples that grow near the site of ancient Sodom. Here also are the most distorted forms of the cacti, and an inferior growth of greasewood or palaverde. The wealth of this desert is wholly mineral.

A sand-storm playing in Death Valley is a wonderful sight. Sand-augers rise like slender stems, reaching up into the burning atmosphere for thousands of feet and terminating in a bushy cloud. They travel hither and thither and gradually fade from sight. Here mirage raises up spectral cities, groves, fields and tree-margined rivers. A low ruin will seem to be hundreds of feet high; arrow-weeds are magnified into stately palms; and crows walking on the ground appear as men on horseback. Besides crows, here are seen a few poor jack-rabbits, mangy coyotes, buzzards, horned toads, red-eyed rattlesnakes, mice and mountain rats; and in the Panamint Range there are still a few bighorns or Rocky Mountain sheep.

At the summit of the Panamint and Funeral mountains, the thermometer at times, it is said, falls to 30 degrees below zero. The mineral wealth of this region is great. In the Panamint Range are many mines of antimonial silver ore; and copper, gold, iron, travertine, onyx and marble are also found. In the Funeral Range, gold, silver, lead, copper and antimony have been found in paying quantities, while the thick strata or measures of the east and southeast hills show almost inexhaustible quantities of colemanite, a borate of lime named for W. T. Coleman, who was one of the first to discover this deposit and find out its richness in borax. Very rich gold quartz has been taken from mines along the route traveled by the ill-fated old emigrant party. Human society in Death Valley is confined to a few miners in the Funeral, Calico and Panamint mountains, some few roving bands of Piute Indians and a few squaw-men owning cattle and horses. Visitors to Death Valley should not go earlier than 15 October, nor later than 15 April; no one should attempt to cross it while a sand-storm is blowing; a gallon of water is needed for each person in a party, and three gallons for each horse. At present one can go from Dagget on the Atlantic and Pacific Railroad, but the route is little better than from Panamint to Furnace Creek and up through Nevada via Pioche, Nev.

DEATH'S-HEAD MOTH, a species (*atropos*) of *Acherontia*, genus of the Sphinx or hawk-moth family, one of the largest of the group, widely distributed over the world, being found in parts of Africa, Asia and Europe. It is crepuscular in its flight. Its fore wings are blackish-brown, with transverse lines of black and a white spot near the middle. The hind wings are yellow, with black stripes crossing the middle and tracing the margin. Upon the dark thorax is described in pale yellow a mask resembling a man's skull. Hence the common name. The moth is about five inches in extent of wings. The caterpillar is of the same length, of bright yellow color, with violet stripes and a row of blue spots along the back. It is injurious to potato and tomato plants, and in some localities is said to rob beehives of their honey withstanding the attacks of the bees. When frightened or seized, the moth gives forth a squeaking noise. This, with the death's head, suggests an evil omen to the superstitious, making appropriate the generic name *Acherontia*. Similar superstitions attach to other members of the genus.

DEATH'S JEST BOOK (‹The Fool's Tragedy›) is the most extensive and important work of Thomas Lovell Beddoes, begun by him at Oxford in 1825 and touched up and altered till near the close of his life. It was finally published in 1850. The play is a tragedy of revenge, written under the inspiration of such later Elizabethan dramatists as Webster and Tourneur, but embodying also a spirit of fantastic horror, a love of grim and spectral imagery, derived from early 19th century romance. Beddoes' special contribution is a species of weird merriment in death, sufficiently suggested by the strange title, ‹Death's Jest Book.› On one occasion the figures representing the mediæval dance of death descend from their places on the walls of a cathedral to partake of a banquet with living men. The prime mover of the tragedy is a court fool, Isbrand, who causes the body of his murdered brother to be interchanged in the grave with that of the wife of his murderer, Duke Melveric. Melveric, by the incantation of an Egyptian sorcerer, summons up the spirit, thinking it his wife's and at the close of the drama is obliged to accompany the ghost to Hell. In plot construction, characterization, and all the specifically dramatic qualities Beddoes is very weak, but the songs with which the piece abounds are rich in poetry of a highly individual kind. Consult ‹The Poetical Works of Thomas Lovell Beddoes› (edited with a memoir by Edmund Gosse, 1890).

James H. Hanford.

DEATHWATCH, a small blackish beetle, about a quarter of an inch long, of the genus *Anobium*, common in Europe and America. It receives its ordinary name from the ticking sound which it makes in the woodwork of houses — 6 to 12 distinct ticks being produced at regular intervals, like the clicks of a watch. These rappings are caused by the striking of the beetle's head on the hard wood, presumably to attract the attention of its mate. Both the beetle and the larvæ of several species are destructive of books, and are the real bookworms.

DEBACLE, dā-bäkl (Fr. *débâcle*), a sudden breaking up of ice in a river; used by geologists for any sudden outbreak of water, hurling before it and dispersing stones and other débris.

DE BARY, bä'rē, **Heinrich Anton,** German botanist: b. Frankfort-on-Main, 26 Jan. 1831; d. Strassburg, 19 Jan. 1888. After a course of medical studies he began in 1853 to practice in his native city, but next year became a *privat-docent* in Tübingen, and the year after was called to be professor of botany at Freiburg, where in 1859 he was appointed ordinary professor. From 1866 until his death he was editor of the *Botanische Zeitung*. In 1867 he obeyed a call to Halle, and in 1872 to Strassburg, where he was the first rector of the newly reorganized university. As a botanist, De Bary is famous especially for the contributions he has made to our knowledge of the morphology and physiology of the fungi and the Myxomycetæ. Of his numerous works in these departments, the ‹Comparative Anatomy of Phanerogams and Ferns› has been translated (1885); as also the ‹Morphology of Plants› and ‹Lectures on Bacteria› (1888).

DEBAT-PONSAN, dē-bä-pôn-sän, **Edouard Bernard,** French painter: b. Toulouse 1847; d. 1913. He was a pupil of Cabanel and although he has produced some noted historical works, is chiefly known as a genre and portrait painter. He won the second grand prize 1872, a medal of the second class 1874, receiving the ribbon of the Legion of Honor 1881, and a bronze medal in 1889. He signed his name Ponsan-Debat until 1880. His pictures include historical subjects such as ‹A Story of Phieltas› (1870); ‹The First Morning› (1874); ‹Jephtha's Daughter› (1876), in the Carcassone museum; ‹Saint Paul upon the Areopagus› (1877); ‹Devotion of Saint Louis toward the Dead› (1879); ‹A Door of the Louvre on Saint Bartholomew's Day› (1880, Clemont-Ferrand Museum); and portraits of Doctor Pichaud (1874); Paul de Cassagnac (1882); General Boulanger; etc. Among allegorical works his ‹Nec Mergitur› (1898), inspired by the Dreyfus case, is famous and his genre paintings ‹The Untamable Mare› (1911), and ‹Those Who Watch› (1912) are executed in a finished academic style, showing literary rather than pictorial imagination.

DEBATABLE LAND, a district of country on the west border of Scotland and England, for a long time a cause of contention between the two countries and a refuge for outlaws. In 1542, a joint commission appointed by the two kingdoms divided the land east and west by a line between the rivers Esk and Sark.

DEBATING SOCIETIES. See Education, Supplemental.

DEBAY, dę-bā', **Auguste Hyacinthe,** French painter and sculptor: b. Nantes, 20

PANAMINT MOUNTAINS AND DEATH VALLEY

April 1804; d. Paris, 14 March 1865. He was a son of J. B. J. Debay the elder (q.v.), and was a pupil of his father and of Gros. He took a medal of the third class 1819 at the age of 15, the second prize of Rome in 1822 with his painting 'Orestes and Pylades'; the first grand prize of Rome with his painting 'Ægisthus Discovering the Body of Clytemnestra,' and a first-class medal in 1831. From 1830 onward he exhibited in all the expositions at Paris, either as painter or sculptor. His principal pictures are 'The Old Man and His Children'; 'Enlisting at the Place du Palais Royal'; 'The Meeting at the Field of the Cloth of Gold'; 'Attila'; 'Promenade of Sixtus Fifth'; and the 'Battle of Dreux.' As a sculptor he received honorable mention for his 'Napoleon I.' (1841); the first prize in open competition for the monument of Monsignor Affre, now at the church of Notre Dame, Paris; and a first-class medal at the Exposition 1855 for his best-known work, 'Primitive Cradle'; first shown in 1845. Among other works are statues of Perrault and Claude Lorraine, at the new Louvre; and the marble mausoleum of the Comte and Comtesse de Damas.

DEBAY, Jean Baptiste Joseph, The Elder, French sculptor: b. Malines, Belgium, 16 Oct. 1779; d. Paris, 14 June 1863. He was first a pupil of the painter Van Biscom, then went to Paris and studied under Chaudet. Summoned to Nantes, he made 30 busts for the library, 10 statues for the Exchange, the frontal of the Hotel de Ville, and the statues of Saints Peter, Paul and John. Returning to Paris 1817, he made two colossal statues of Neptune and Apollo for Havana; and took a second-class medal with a bust of Talma. Among his works are a bronze equestrian statue of Louis XIV at Montpellier; statue of the 'Chancellor of the Hospital' at Aigueperse; marble statue of 'Mercury putting Argus to Sleep' and 'Mercury Preparing to Slay Argus' at Havana; group of the 'Three Fates'; marble statue of Charles Martel in the museum at Versailles; marble statue of Colbert; 'Young Woman and Shells,' considered his best work; and the figures of 'Ocean' and 'The Mediterranean' for one of the Place de la Concorde fountains. During his later years he held the position of restorer of sculptures at the Louvre. He received the decoration of the Legion of Honor 1825. He executed numerous portrait-busts in excellent style.

DEBAY, Jean Baptiste Joseph, The Younger, French sculptor: b. Nantes, 31 Aug. 1802; d. Paris, 7 Jan. 1862. He was the eldest son of the preceding. He was a pupil of his father and of Bosio, and went to Havana at 17 years of age to deliver his father's statues. He took the second prize of Rome 1823, with a bas-relief, 'The Grief of Evander,' and in 1829 the first grand prize of Rome with the 'Death of Hyacinth.' He received the decoration of the Legion of Honor in 1851. Among his works are 'Theseus'; 'Genius of the Sea'; 'Genius of the Hunt'; 'Young Slave' (first-class medal 1836); 'Anne de Bretagne' (Luxembourg Garden); a bronze statue of 'Cambronne' (Nantes); 'Marshal Oudinot' (Bar-le-Duc); 'Modesty and Love,' marble group; equestrian statue of Napoleon III (Bordeaux); 'Six Apostles' (Church of Saint Eustache, Paris); and 10 statues for the Pommeraie Gallery at Nautes.

DE BECKER, Jules Alphonse Marie, Belgian ecclesiastic and educator: b. Louvain, 7 Dec. 1857. He was educated at the Josephite College and Catholic University of Louvain, and the Gregorian University, Rome. He was ordained to the priesthood in 1881, was appointed professor of canon law and liturgy at the American College, Louvain, in 1885, and after 1889 served as professor of canon law at the Catholic University there. He was made a canon of Mechlin Cathedral in 1891 and in 1898 became rector of the American College, Louvain. At the latter institution he founded a chair of philosophy and secured the admission of its students to the theological courses of Louvain University. In 1904 Pius X appointed him a member of the commission for the codification of the canon law. He has published 'L'Église aux États-Unis' (1903); 'De Sponsalibus et Matrimonis' (1903); 'Legislatio nova de forma substantiali quoad sponsalia et matrimonium' (1908), and contributions to the *American Ecclesiastical Review, La Revue générale,* 'The Catholic Encyclopedia,' etc.

DEBENTURE, in finance, a certificate or document signed by a legally authorized officer, as an acknowledgment of a debt due to some person; a deed or bond of mortgage on certain property for the repayment to a certain person of a certain sum of money advanced by such person, together with interest thereon at a certain stated rate. Debentures are frequently issued by public companies, especially railroad companies, for the purpose of raising money for the completion or carrying on of their undertakings. They differ from certificates of stock in that they contain some form of covenant to repay the principal sum with regular interest at some date specified in the future. They are also issued in series and for the purposes of borrowing money. They may or may not be negotiable.

In customs, a certificate entitling the person to whom it is granted to a drawback on certain goods exported, the duties on which had been paid.

In public offices, in some government departments, a term used to denote a bond or bill by which the government is charged to pay a creditor or his assigns the money due on auditing his account. The issuing of debentures is regulated by general statutes in the laws governing corporations. Consult Palmer, 'Company Precedents' (London 1902).

DEBIT AND CREDIT ('Soll und Haben'). Out of the hunger for a national life, for a character that should be nationally German, for traditions upon which to build them and hopes wherewith to feed them, grew such novels as Gustav Freytag's 'Debit and Credit' (1855), called by the Germans a *Zeitroman,* or novel of the times, to distinguish it from the historical romance or novel of other days. The book was a direct product of the revolution of 1848. 'Debit and Credit' is the apotheosis of the great middle class, the merchant class, to which Germany owes so much of her growth, her success and her constructive national spirit. As such it has made a unique place for itself in German literature, and was in its day as widely translated and read as any book in the language. In spite of Freytag's consciousness, however, that in painting such an imaginative picture of the people he loves an author must use exceeding care to avoid «distortion in the outline of his picture, because not love alone, but hatred too, flows freely and readily from the pen,» the book has, in a marked degree, the defects of its qualities. The glorified pictures of Anton, Schröter, Sabine and the other middle class men and women, the likenesses of the slowly decaying landed aristocracy, of the rapacious Jews to whom they become a prey, of the Poles — a romantic and incapable nobility, a debased peasantry — who give way before the intelligent, eager, idealistic German colonists — all bear the stamp of that untruth which comes not of a purpose to be false but of prejudice. The book has been well translated into English, with an enlightening preface by the Chevalier Bunsen.

Edith J. R. Isaacs.

DEBORAH, Hebrew seer or prophetess. She lived in the time of the Judges, and by the aid of Barak delivered the northern tribes from the oppression of Jabin and secured a peace of 40 years' duration. The triumphal ode attributed to her is a remarkable specimen of Hebrew poetry. The story is told in ‹Judges› IV and V.

DE BOW, James Dunwoody Brownson, American journalist and statistician: b. Charleston, S. C., 10 July 1820; d. Elizabeth, N. J., 27 Feb. 1867. He studied law, was admitted to the Charleston bar in 1844, became a contributor to the *Southern Quarterly Review,* published at Charleston, and in 1844 took charge of that periodical as chief editor. Among other papers prepared by him for its pages was an elaborate article, published in 1845, upon ‹Oregon and the Oregon Question,› which attracted much attention both in this country and Europe. It was translated into French and was the occasion of a debate in the French Chamber of Deputies. In 1845 he removed to New Orleans and established *De Bow's Commercial Review.* This enterprise proved successful and the work attained a circulation greater than has ever been reached by any similar publication in the South. In March 1853 he was appointed superintendent of the United States census. In that position he collected and prepared for the press a large part of the material for the quarto edition of the census of 1850. He afterward compiled the volume entitled ‹Statistical View of the United States,› a compendium of the 7th census. In 1853 he compiled from his review a work published under the title of ‹Industrial Resources of the Southwest.›

DEBRAUX, de-brō', **Paul Émile,** French balladist: b. Ancerville, department of Meuse, 30 Aug. 1796; d. Paris, 12 Feb. 1831. He was an ardent Republican and wrote for the common people lively songs of wine and love, sung everywhere in tavern and workshop. He was called «the Béranger of the rabble.» His best-known songs are ‹Mt. Saint John›; ‹Belisarius›; ‹Say, Do You Remember?›; ‹The Soldier's Widow›; ‹Marengo.› Béranger published a complete collection of his ‹Songs.›

DE BRAY, Guido, one of the most famous of the Walloon writers and reformers, and author of the Belgic Confession of Faith, one of the great creeds of the Reformation and noblest monuments in the Walloon language: b. Mons, in Hainault 1520; d. Valenciennes, May 1567. The Belgic confession was adopted by the nobles as well as by the Reformed clergy. Translated into Dutch, German and Latin, the Belgic Confession was printed and presented in 1562 to Philip II of Spain, overlord of the Belgic Netherlands, in the vain hope of securing toleration. The invasion and desolation of the Walloon and Flemish provinces followed five years later. De Bray was active as preacher and scholar among his refugee countrymen in France, Germany and England, he being at home in both the Flemish and Walloon tongues. He wrote an important work in Latin, condemning the tenets and excesses of the Anabaptists. Cast into prison by the Spaniards in 1567, he wrote letters to his wife and mother, which are classics. The Belgic Confession is the standard of belief in the Reformed Churches of Belgium, in the Netherlands, in the Dutch colonies and in the Reformed Church in America. Consult Langaard, L. A. van, ‹Guido de Bray›; ‹Zyn Leven en Werken,› Zerikzee (1884); Schaff's ‹Creeds of Christendom› (1877); Griffis, ‹Belgium, the Land of Art› (1912).

DEBRECZIN, dā-brĕt'sĭn, **Hungary,** a free imperial city on the edge of the great central plain of Hungary, about 137 miles east of Budapest by rail. Its houses are mostly of a single story; and in wet weather the wide but unpaved streets become almost impassable from mud. The chief edifices are the principal Protestant church (from the pulpit of which Kossuth moved the resolution declaring that the House of Hapsburg had forfeited the Hungarian crown, 14 April 1849); and the principal Protestant college, with an attendance of about 2,000 students and a library containing nearly 160,000 volumes; Roman Catholic church, town-house, Piarist college, gymnasium, etc. Both the manufactures and trade are important; the former consisting chiefly of coarse woolens, leather, soap, tobacco-pipes, casks, etc., and the latter being in tobacco, wine, flax, hides, wool, potash, cattle, cheese, etc. There are four large fairs annually and the swine market is the largest in the kingdom. Debreczin is the headquarters of Hungarian Protestantism. The Protestant college, founded in 1531, is considered the best educational establishment in Hungary. This town suffered much in the wars between the Hungarians and the Turks, and afterward in the religious wars. Pop. 92,729.

DE BRY, dė-brē' **Theodor,** Flemish goldsmith and copperplate engraver: b. Liège 1528; d. Frankfort-on-the-Main, Germany, 1598. He settled in Frankfort-on-the-Main about 1570 and established a printing-house there. On a visit to England he engraved the ‹Procession of the Knights of the Garter under Queen Elizabeth› (12 plates after Geerarts) and ‹The Funeral of Sir Philip Sidney› (34 plates after Thomas Lent). The most important of the works issued from his press is the collection of ‹Voyages to the East and West Indies,› published in Latin (25 parts, 1590–1634) and German (27 parts 1590–1630). The New York Public Library possesses an excellent collection of his prints.

DEBS, Eugene Victor, American socialist: b. Terre Haute, Ind., 5 Nov. 1855. He received a common school education and became a locomotive fireman. He was elected to the Indiana legislature in 1884 and was later an official of the Brotherhood of Locomotive Firemen, and, from 1893 to 1897, president of the American Railway Union. He conducted the strike of 1894 in Chicago and was later sent to jail for contempt, because of his management of the same, though he pleaded innocence of any crime and requested to be tried by a jury and be allowed to summon witnesses in his defense. Since 1897 he has been prominent in the Socialist movement, and in 1900, 1904, 1908 and 1912 was the candidate of the Socialist party for President of the United States. In 1907 he joined the editorial staff of the *Appeal to Reason*, remaining in its service six years, during which time he made a nation-wide speaking and organizing campaign in the interest of the Socialist party. Since 1914 he has been the editor-in-chief of the *National Rip-Saw* published at Saint Louis and while serving in this capacity he is continuing his speaking tours in the interest of the Socialist movement. In 1915 he was elected chancellor of the People's College, a working-class educational institution organized upon a co-operative basis for the education of working people through correspondence courses, as well as the regular course in the parent school, located at Fort Scott, Kans. In 1916 he declined the nomination of the Socialist party for President of the United States.

DEBT (Lat. *debitum*, owed) in legal acceptance is a stipulated amount of money that one person owes to another under contract or agreement. In popular usage it implies the idea of a certain and definite sum due by book, note or bond, whether money, goods or services, that can be verified by data arising out of the transactions. While denoting any kind of a just demand — in its broadest sense meaning duty, or what one owes to another — an obligation of a debtor — debt has different shadings of definition, owing to the subject matter of the various statutes in which it is used; but legally and generally, its significance is embodied in the above definitions. It denotes not only the obligation of the debtor to pay, but also the right of the creditor to receive and enforce payment. In its common significance it implies the moneyed obligation of a person incurred in his private capacity, or from his individual acts, and not such obligations as are imposed upon him by law in his public relations, or in common with all other citizens. It is the correlative of Credit (q.v). As generally defined by statute the word includes any claim or demand upon which a judgment for a sum of money or directing the payment of money could be recovered by an action. As used in the statutes relating to the estates of deceased persons, the term is not limited to such as are strictly legal debts but includes every claim and demand by a creditor, whether recoverable at law or in equity. "Debt" is a common-law word and also a technical term. The legal definition of the word is opposed to unliquidated damages or a liability in the sense of an undetermined or contingent debt not enforceable by ordinary process. A debt exists when a certain sum of money is owing from one person (the debtor) to another (the creditor). A debt is not the less owing because it is not yet due. Everything is a debt which is of absolute obligation, but, in its more limited sense, it implies only a particular kind of duty, and in this sense is substantially synonymous with contract. The word debt, however, is of large import, including not only debts of record or judgment, and debts by specialty, but also obligations arising under simple contract, to a very wide extent, and in its popular sense includes all that is due to a person under any form of obligation, or promise. Even in its broadest significance it implies that the consideration of the obligation of the debtor has been executed on the part of the creditor and the payment of the debt discharges the obligation. In common law, the words debt and demand are of allied meaning, but the latter word is a term of much more comprehensive signification than the former. The term debt imposes a sum of money owing upon a contract, express or implied, while the term demand comprises all rightful claims, whether founded upon a contract, damages, or a superior right of property. (See DEMAND). The words "debt" and "indebtedness" are not always used in the same sense; that is they do not always impose a legal obligation on the part of one to pay another something due to him. They often imply a mere moral or equitable obligation, as well as a strictly legal one. Debt, however, is synonymous with due; they are both derived from the same verb. The words "debts now due" are held as synonymous with the word "liabilities." While debt means that which is due from one person to another, the word due does not necessarily vary the meaning, as that means, in one sense, simply owed. It may, when used with that intent, mean a debt actually payable, the time for the payment of which has arrived. The context and the circumstances under which it is used must determine in what sense it is used. Due, when used as a noun, is synonymous with debt. See DEBT, ACTION OF; DEBTOR; DEBTOR AND CREDITOR, LAWS OF. Consult Mack, W., *ed.*, 'Cyclopedia of Law and Procedure' (Vol. XIII, pp. 393–401. New York 1904).

DEBT, Action of. This is one of the oldest procedures known to the common law and in its origin of a personal right or proprietary nature. The law officer was commanded by the writ of debt to order the defendant to return to the plaintiff the sum of money or property, of which he unjustly deprived him; and if the defendant refused, he was to give his reason in the King's Court. The action was often settled with trial by battle. After the evolution and development of the action of assumpsit (q.v.), that action for a time supplanted action of debt on simple contracts. At common law there was perhaps no action which had so extensive and varied an application. While in modern procedure it has been found unwise to extend this form of remedy, where its limits are definite and clearly established, it has nevertheless been given a much wider scope than the language of the elementary writers would seem to justify. While no longer in vogue in England, in some jurisdictions in the United States, statutes have expressly declared this remedy to be appropriate for the enforcement of certain obligations or the recovery of designated penalties. It has long been held and is now so well recognized by the courts as a whole that it may be said to be a general rule, that action for debt is a concurrent remedy with assumpsit upon all simple contracts where the sum to be recovered is certain or may readily be ascertained either from the contract itself or by operation of law. A distinguishing feature of this action is that it lies only for the recovery of a sum certain, or readily reducible to a certainty from fixed data or agreement, as distinguished from unliquidated or unascertained damages. See Debt; Debtor and Creditor, Laws of.

DEBTOR, a person who owes a debt, or is under obligation, arising from express agreement, implication of law, or from the principles of natural justice, to render and pay a sum of money to another. A person who by reason of an existing obligation is or many become liable to pay money to another whether such liability is certain or contingent is classed as a debtor. So are persons who have engaged to perform, or who owe to others the performance of an obligation; or who owe anything to others as money, goods or services. The term "any debtor" includes anyone who is capable of contracting a debt and has done so. The relation of debtor and creditor may arise by direct agreement or through breach of duty between the parties; the relation of debtor and creditor implies, naturally, that the one has given credit to the other in a contract. The word debtor in its broad sense implies liability and includes corporations and partnerships as well as individuals. It likewise includes the indorser of a promissory note before maturity and all those who at the appointment of a receiver for the winding-up of a bank are liable to the bank for the payment of money, whether their liability had matured or not, and without any regard to the exact nature of the liability, whether as principal or surety. If a person depart from his usual residence or remain *absent* therefrom, or conceal himself in his house, so that he cannot be served with process, with intent unlawfully to delay or defraud his creditors, he is an *absconding* or *delinquent* debtor. But if he depart from the State or from his usual abode, with the intention of again returning and without any fraudulent design, he has not absconded nor *absented* himself within the intendment of the law. Where a man stays away with intent to delay his creditors, he thereby *absents* himself within the meaning of a statute providing that traders *absenting* themselves to delay creditors shall be adjudged bankrupts. See Debt; Debt, Action of; Debtor and Creditor, Laws of.

DEBTOR AND CREDITOR, Laws of. One of the earliest institutions among men is the right of holding individual property. Upon this right depends the power of making bargains and effecting exchanges. In various ways bargain-making gives rise to deferred engagements, and obligations are incurred which are called debts. These obligations rest upon a double foundation. The right of holding individual property implies the right of recovering any property which has been entrusted to others, or of claiming possession of any property which others have, for a valuable consideration, agreed to make over to us. The primary foundation of debts, therefore, is the right of holding property. A debt is a contract freely entered into. Whether the right of property is valid or not, it is commonly recognized by the person who incurs debt; no abstract doctrine of the rights of property, therefore, can properly come between him and his creditor to justify the violation of an engagement for which he has accepted an equivalent. Credit affords a means by which those who have no property of their own may acquire important advantages through the use of the property of others, and while proprietary rights are recognized, it is of great consequence to society that the obligations incurred in borrowing should be faithfully fulfilled. Hence a very great practical importance is to be attached to the moral obligation implied in the contract of a debt, independently altogether of any abstract or theoretical views which may prevail as to the soundness of the particular institution of proprietary rights on which that obligation may be founded.

In early and rude states of society the natural tendency is to regard all obligations as sacred and inviolable, and all who from any cause fail to fulfil them as criminal in act or intention, either by omission or commission, and liable to the most severe and exhaustive punitive treatment. In such a state of society both the primary and secondary foundations of the obligation are likely to be held in extreme estimation. Hence in the earlier stages of society the laws against debtors are universally found to be of the most stringent kind, and as civilization advances and the relations of society become more complicated, the necessity of repeated modifications of these severe laws becomes apparent. Any modification in favor of the debtor of the consequences of incurring debt, however equitable in itself, necessarily tends to increase the facility with which debt will be incurred; and if these consequences are over-relaxed society will be deprived of a needed protection; debt will be incurred carelessly, and as carelessness borders upon recklessness and recklessness upon fraud, the lines of distinction between right and wrong dealing will become fainter, the protection due to misfortune and the condonation necessary to be extended to miscalculation and errors of judgment will become a cover for deliberate conspiracy, and society will become a prey to an organized predatory system or modernized form of highway-robbery, thinly disguised under the forms of commerce. Such are the practical difficulties which the modern theory of the law of debtor and creditor has to encounter.

Among the Jews, under the Mosaic law debt was treated with great stringency, but there were regulations adapted to discourage the incurring of it, and also some humane restrictions on the power of the creditor after it had been incurred. Lending on usury was forbidden, and the taking of pledges put under severe restriction. The alienation of the estate of an Israelite was also forbidden. The creditor, on the other hand, had power over the person of his debtor, and even over those of his wife and family, and could cause them to be sold in satisfaction of his claim. If the debtor was an alien he might be sold to perpetual bondage, but on the occasion of a jubilee, which was appointed to be proclaimed every 50th year, every Israelitish debtor was set free and his property, if pledged or sold, returned to him.

Nothing is more common in rude states of society, and under arbitrary and despotic governments, than the liability of the person of the debtor for his debt. This is one of the original sources of slavery. Even in the comparatively enlightened states of Greece and Rome the power of the creditor over the person of his debtor was recognized by law. This power was abolished in Athens by Solon, who is said to have taken his reform from Egypt, where the same unjust law had already run its course. The early Roman law was even more excessive in its undiscriminating severity. By the law of the Twelve Tables the creditors might cut the body of the debtor in pieces and share it among them, they might also sell him and his wife and family to perpetual slavery. In the Middle Ages, notwithstanding the influence of Christianity, the debtor was treated with hardly less severity. Even the Church took the side of the creditor, and the debtor who died without discharge was excommunicated and deprived of Christian burial. As society became more refined the laws against debtors were again gradually ameliorated, but the process was a slow one. Imprisonment for debt in England, except as an instrument for compelling the surrender of the debtors' effects, was only put an end to in the reign of Victoria.

In the United States originally imprisonment of debtors was adopted as a part of the common law, but at the present time imprisonment for debt, except in case of fraud, or of an absconding debtor, does not legally exist in any of the States. Congress, empowered by the United States Constitution to make a uniform bankruptcy law, exercised this power, and subsequently repealed the law of imprisonment; and now, by Revised Statutes 990 and 991, no person can be imprisoned for debt by any process issuing out of the courts of the United States, in any State where by the laws of the State imprisonment for debt has been abolished. Most of the States, by constitutional provision, have prohibited arrest or imprisonment for debt, while the other States, either by direct statutes prohibiting imprisonment for debt, or by poor debtors laws, or by insolvent laws, secure the same result; it being held to be against public policy to deprive a man, by imprisonment, of the power to pay his debts and make him a direct charge upon the State. See DEBT; DEBT, ACTION OF; DEBTOR.

DEBTS, National. See NATIONAL DEBTS OF THE WORLD; DEBTS, PUBLIC.

DEBTS, Public. Public debts are essentially a modern phenomenon, for before they could appear, private credit with its accompanying mechanism of banks, brokers and credit instruments had to be developed. Certain preconditions had to be met before states could resort to public borrowing on any considerable scale, and these conditions have been fulfilled only in comparatively recent times. These conditions are, first, the existence of a money market where capital can be obtained in exchange for the promises to pay in the future which constitute a public debt. The capital itself, the machinery for carrying on these transactions, and lastly the willingness on the part of capitalists to lend their money must all exist. This last necessity points to the second of the pre-conditions mentioned above, namely the existence of some adequate security by which the lender may be induced to make the desired loan. At first the promise of a needy monarch was backed up by the pledge of some tangible security, as the crown jewels, or land, or the revenues from some impost. But with the development of constitutional government a more adequate guaranty has been given the lender, and with the development of public credit has gone on the expansion of public debts. The greater security afforded the lender under constitutional government consists, as Prof. H. C. Adams has pointed out, in the power and influence exerted by the propertied classes upon the legislative bodies to prevent them from repudiating public obligations. The public creditors in effect lend to a corporation — the government — which they themselves control.

Public debts were first created on any considerable scale in the 18th century, but the 19th century saw an enormous increase in the number of countries making use of public loans and in the sum total of these loans. It has remained for the opening years of the 20th century, however, to demonstrate the extent to which states can make use of their credit in times of national emergency. The following brief table shows the growth of the public indebtedness of the civilized nations of the world for the last two centuries:

NATIONAL INDEBTEDNESS OF THE WORLD.*

YEAR	Aggregate debt	Per cent of increase
1714	$1,500,000,000	......
1793	2,500,000,000	66.7
1820	7,750,000,000	210.0
1848	8,650,000,000	11.6
1862	13,750,000,000	58.9
1872	23,025,000,000	74.7
1882	26,970,000,000	17.1
1890	27,525,000,000	2.0
1908	36,548,000,000	32.8
1912	42,000,000,000	16.0
1918	150,000,000,000	258.5

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* The figures for the years 1714–1882 are from Adams' "Public Debt," p. 4; those for 1890–1912 are from the U. S. Census volumes on Wealth, Debt, and Taxation; while those for 1918 were compiled by the author, but represent the indebtedness only of the seven leading nations engaged in the European War. Consult 'Direct Costs of the Present War' (Carnegie Endowment for International Peace, Washington 1918).

Purposes, Temporary Necessity.— The purposes for which governments may properly incur debts are in the main reducible to three — temporary necessity, special emergency and the construction of public works. The first of these arises when the actual revenues fall below the estimated revenues and a deficit ensues. It is, of course, impossible that the budget should exactly balance every year, and either a surplus or a deficit is likely to result. Constant surpluses are dangerous as tempting the legislative body to extravagance, and should be avoided. We have only to point to congressional extravagance in the United States between 1888 and 1892 for illustration. Occasional deficits may, therefore, be regarded as a normal incident, and provision should be made for meeting them by the issue of short term treasury notes, payable, as in the case of the Federal government, in three years, or an even shorter period. These should be met out of taxes which may be increased for this purpose, or the necessary funds be met by greater economy on the part of the legislative body for the next two or three years. It is only when these temporary deficits become recurrent and when accumulated deficits are converted into permanent obligations, as in Austria from 1904 to 1914, that this practice becomes dangerous. This method of treating temporary deficits must be condemned, as they should never be allowed to become a part of the permanent debt.

Special Emergencies.— By far the greatest part of existing national debts has been incurred to meet special emergencies, of which war has been the chief. An emergency arises when the need of the government for money is immediate and pressing, so that it cannot wait for the tardy returns of new taxes. There are several conceivable ways in which such a situation might be dealt with which may be briefly described. In the first place a nation might accumulate in prosperous times a reserve fund or "war-chest" for use in emergencies. Such a method has been followed by Prussia since the time of Frederick the Great; since 1871 this war chest had consisted of $25,000,000 in specie, which in July 1913 was increased to $60,000,000, in addition to which there were various securities. It may be conceded that such a reserve fund renders the first mobilization of the troops somewhat easier, but as a substitute for borrowing the enormous sums necessary in a modern war it is ludicrously insufficient. Moreover, there are various serious financial weaknesses in this method.

In the first place a reserve sufficient to meet such an emergency as war could not be accumulated; the people would not submit to the present real sacrifices involved for the sake of warding off a future imaginary danger. Moreover, in a democratically governed country such a fund would be exposed to constant assaults for diversion to other uses which could probably not always be successfully resisted. But if the fund were kept intact it would result in continuous loss, for it would subtract just that much from the nation's money supply if it existed in the form of specie. While if it took the form of securities the situation is still more absurd, for to realize upon these when the emergency arose would compel their sale in a falling market, and would after all differ in no essential respect from the sale of the government's own securities. The policy of a reserve fund as an alternative to public borrowing must, therefore, be dismissed as ineffectual and unwise. In practice it is so little used to-day that we need give it no further consideration.

Another method by which a state might raise considerable sums in order to meet a sudden emergency, which is closely analogous to that just described, is by the sale of public property or government owned enterprises. In states like Prussia, which owns its railways, or New Zealand, which owns much of the land, considerable sums might be realized in this way. These states have accumulated a fund of wealth not specifically as a war chest, but it is suggested that this capital might be used rather than go into debt; utilize past accumulations rather than mortgage the future. But aside from the fact that most nations do not have large amounts of disposable wealth this method is open to the same objection as in the previous case, that such sales would be effected in a falling market. In times of sudden emergency, like war, it would involve a tremendous loss and might bring in returns quite incommensurate with the sacrifices made.

Another method of meeting the urgent demands of a sudden fiscal emergency is to raise the rate of some existing tax or taxes so as to bring in the needed additional revenue; as an illustration the English procedure with the income tax may be cited. The machinery for collecting this tax is always kept in good working order, but the rate of the tax is kept purposely low; then when a sudden emergency occurs additional revenue may be quickly secured by the simple expedient of raising the rate. "That is to say," writes Prof. H. C. Adams, "this policy establishes a war-chest whose funds are deposited with the people, and assigns a particular tax to serve as its key." Exception may possibly be taken to the use of the income tax solely as an emergency tax, for the income tax should form an integral part of any scientifically constructed scheme of taxation, and its full use should not be reserved for special needs. But the principle is unimpeachable and was invoked in this country when the sudden need of greater revenue in 1914 led to the emergency taxes of that year, which consisted simply of an extension of the internal revenue system. On the other hand the lack of such an easily expansible system of taxes was keenly felt at the beginning of the War of 1812 and again when the Civil War began. This method, however, is not always feasible at the beginning of a fiscal emergency when funds must be had at once; it takes time for new taxes to become remunerative, and a sudden or large increase in the rate of existing taxes may introduce greater evils and injustices in a well-adjusted tax system than would be involved by a resort to borrowing.

A fourth method by which a nation, in case of a fiscal emergency, could avert recourse to borrowing might be the issue of paper money. But so serious and far-reaching are the effects of this that the use of its credit in this fashion is generally resorted to by a modern nation only in the last extremity. Perhaps the best example of a war financed by the issue of paper money rather than by taxes or loans is the American Revolution against England. As the Continental Congress was not clothed with power to levy taxes and did not have the financial standing and prestige to enable it to borrow money at the beginning of the struggle, it was forced to resort to the only alternative open to it, namely the issue of bills of credit. The necessity of issuing large amounts with consequent overissue, depreciation in value, derangement of prices with accompanying injustices as between debtors and creditors, and the final practical repudiation of its obligations by the government itself, constitute a story which has been repeated in essentials in almost every case where the government has resorted to this method. In the present European War practically every belligerent has issued paper money, though it has so far been kept within manageable limits, but the fall of foreign exchange with neutral nations marks the extent, in part at least, of the overissue and consequent inflation which has occurred in each country. The use of paper money may indeed be regarded as involving the credit of the issuing country so that it is only another and less defensible method of borrowing, and in fact is often called a "forced loan." We are, therefore, thrown back upon the final alternative, that of public debts, as the only feasible method of meeting a sudden fiscal emergency, at least at the beginning.

Never has this method of financiering been illustrated on so stupendous a scale as during the European War, which began in 1914. Taxation was resorted to sparingly during the struggle itself, England being the only country which made vigorous use of this source of revenue. General resort was had to the issue of paper money, either directly by the government or indirectly through the increased circulation of bank notes issued by government-controlled institutions. But the main reliance of all, and the sole financial resource of some nations, was loans. By the middle of 1918 the new war loans created since July 1914 by the seven leading powers amounted to about $150,000,000,000. As the debts of these same nations, namely, the United States, France, Great Britain, Italy, Russia, Austria-Hungary and the German Empire, amounted to about $23,000,000,000 before the war, their aggregate debt on 1 Aug. 1918 was not far from $175,000,000,000. This represented a per capita charge on the populations of these seven nations of about $361, as against $47 in 1914. It has been estimated that this indebtedness is equal to about 15 per cent of their national wealth. The burden involved in such a charge is perhaps made clearest by comparing it with the per capita debt of the United States, which amounted to $10.59 in 1913, representing one-half of 1 per cent of our national wealth.

Public Works.— There is one other purpose for which the employment of public credit is justifiable and that is the construction of public works. If a canal or an electric light plant is to be constructed it is essential both from an engineering and a fiscal point of view that the money for this purpose must be instantly available so that the work can be carried through to completion without any unnecessary delay. From the engineering standpoint any interruption means waste, for an idle plant, half constructed, would rapidly deteriorate and much of the work would have to be done over again. While from a fiscal standpoint it is essential that the whole work be completed as speedily as possible in order that it may become productive; a half finished canal or electric light plant involves expense but brings in no return. To raise the large sums necessary to carry out a modern public work it is necessary to resort to public loans, as it would be both impracticable and unjust to attempt to secure them by taxation. Moreover, in the case of an improvement whose use extends over a long period of time, it is not unreasonable to ask future generations to share in the burden.

Advantages of Borrowing.— We may at this point endeavor to summarize briefly some of the alleged advantages and disadvantages of public debts. It is necessary to emphasize the fact that the question is not as to whether the money asked for shall be spent. We must assume that the need exists and that the proper authority has decided upon the expenditure. Then the only question is as to the relative merits of public borrowing as contrasted with other methods of raising the necessary funds. Numerous advantages have been cited in favor of the policy of public debts, such as that it affords a safe and convenient form of investment; this may have been true in the 18th century, but could hardly have much force in this age of corporate and public utility securities. It has also been urged, as by Alexander Hamilton in this country, that the issue of government bonds is equivalent to the creation of so much new capital in the country. Some writers have even carried this doctrine so far as to suggest that the cause of England's wealth was the existence of her large national debt.

A more solid advantage lies in the fact that by a policy of borrowing a government can secure that part of the national capital which is easily disposable, while a system of extremely heavy taxation might have serious economic consequences and result in practical confiscation of some incomes. The purchaser of a government bond gives his property voluntarily for public uses in exchange for an equivalent; it is not, therefore, in ordinary circumstances withdrawn from production, but only the free capital, the surplus from current income, is placed at the disposal of the government. Private industry is, therefore, interfered with as little as possible under this system. Of course this argument assumes that the rate of interest offered by the government is not so high as to cause the withdrawal of capital from existing industries. In case this is done this argument loses much of its force.

But the most convincing argument in favor of a policy of public borrowing lies in the fact that the financial burden of the present generation is thereby lessened and future generations are made to contribute to expenditures, a part at least of whose benefits they will share. This is particularly true when very large sums are needed for undertakings that will last for a long time, as any great engineering work, like a state-owned railroad or a canal or a road system, or municipal improvements such as sewers, street pavements or a lighting plant. In all such cases the expenditure is an investment of capital, the returns from which will be enjoyed by possibly several generations of taxpayers, and it is consequently argued that they should be expected to bear a part of the cost. The same argument would apply to expenditures for war, at least for a war of defence, which should protect the country and possibly preserve its very integrity and independence. Here is an immeasurable benefit, the costs of which may fairly be distributed among successive generations through the medium of a public debt.

Disadvantages of Public Debts.— On the other hand, there are undeniable disadvantages and dangers connected with the constantly increasing tendency to resort to public credit to meet all unusual or large expenditures. Perhaps the greatest danger is connected with the last argument cited in favor of public debts. It is so easy to impose the burden of an unusual cost upon the next generation by borrowing the money instead of levying heavier taxation that there is danger that this may be done when there is no real justification for it. Many a local community in the United States to-day is paying the interest on bonds issued to pay for improvements that either never were constructed or wore out before the debt was paid.

Another danger lies in the effect which the raising and spending of large sums obtained by the sale of government bonds may have upon private industry. This will be keenly felt if the need of the government is great and it raises the rate of interest in order to attract the needed supply of capital. Then the capital which would normally have replaced losses through depreciation, or have provided for ordinary growth of the business, may be diverted from private industry into the public purse. But before describing even such a diversion as an evil we shall have to know the use to which the money will be put. It may be that the government expenditure will bring advantages so great as far to outweigh any losses that may be inflicted upon private industry; unhappily the reverse has generally proven to be the case in the past.

Classification of Public Debts.— In the creation of a public debt various technical questions arise which it is necessary to describe if we are to have a clear idea of its character. The classification of public debts may first be considered, and here there are several lines of distinction. A usual distinction is that between forced loans, or legal tender paper money, and voluntary loans or bond issues. As the former may more properly be discussed under the title paper money, we shall pass on to the further classification of bonds. With reference to the character of the security behind them, these may be classified as floating or funded; the former consist of unpaid accounts charged against the state, while the latter are debts which have been formally acknowledged by the government and their payment provided by law.

Funded debts again may be classified with reference to the time they have to run, into terminable and perpetual debts. By the former is meant debts which run for a certain specified term upon the expiration of which they are redeemable or convertible at the option of the government. By a perpetual debt is meant one whose contract mentions no time at which payment can be demanded by the creditor; while the government theoretically may pay off such a debt at will, it seldom exercises the privilege, and the debt becomes practically a perpetual one. Such is the form in which most of the French debt has been thrown, while the favorite form for debts incurred by federal, state or local governments in the United States has been the terminable bond.

One great advantage which the latter has is the fact that the government is thereby given the power, when the bond matures, of converting it into another one bearing a lower rate of interest. Inasmuch as most loans are created in times of crisis or of urgent necessity, the rates of interest have probably been higher than they will be subsequently. Moreover the tendency of the whole 19th century was toward lower interest rates. Short term bonds with frequent conversions would, therefore, lower the national interest charge and set free income which could be used to pay the principal of the debt. Sometimes the debt is thrown into a form intermediate between the terminable and perpetual, namely the annuity. This is really paid in installments, for the obligation of the government is terminated upon the expiration of the term agreed upon, whether a certain definite time or the life of an individual.

Rate of Interest.— Another technical question to be decided when the debt is created is whether loans shall be placed at or below par. The general verdict is that the government should fix the rate of interest at a point that will approximate the market rate as closely as possible, for if it is fixed any lower the bonds will sell for less than par and the government will then have to pay back a larger sum when it extinguishes the debt than it receives at the time of sale. Usually only those nations which have a practically perpetual debt have preferred to sell their bonds at a discount in order to secure the lower interest rate.

Should a Public Debt be Paid?— The final problem, but probably the most important of all after the debt has been incurred, is that of debt payment. Should a nation endeavor to pay off its debts? The policy adopted by the United States from the very beginning of its national existence has been one of debt payment, but this policy has not been generally adopted by other nations. England was practically the only European nation which reduced its national debt during the 19th century. This difference in practice reflects two very different theories as to the desirability of debt payment. The one school holds that the only way to get rid of or reduce the burden of a debt is to pay off the principal; the other wishes to accomplish the same purpose by so developing the resources of the country that the burden of the debt becomes negligible.

The arguments against debt payment or rather in defense of a perpetual debt may be briefly stated. It is claimed that the burden of a public debt is gradually lessened by the depreciation of gold; but this is both too uncertain and too tardy in effect to be assigned much weight. Another argument which is entitled to more serious consideration holds that the burden of debt will be diminished by the natural growth of the country in population, industries and wealth. Thus while the French debt, for instance, trebled between 1840 and 1870, the national wealth grew as rapidly and the burden of the larger sum was not felt any more heavily than was the smaller amount a generation before. A third argument urges that surplus revenue should be applied to other reforms before that of debt payment. Thus, John Stuart Mill, writing of English conditions in the forties, said, "the increase of revenue should rather be disposed of by taking off taxes than by liquidating debt, as long as any very objectionable imposts remain." Eventually, he admitted, the remission of taxes should stop and the proceeds be applied to debt payment, but other writers have been unwilling to grant this and have insisted that "taxes fructify in the pockets of the taxpayers," that these could promote the national welfare more if they were not taxed than if taxes were collected and applied to the payment of a national debt.

The arguments advanced in favor of a policy of debt payment rest upon firmer economic ground and justify the action of this country. These are partly economic and partly political. In the first place it has been argued that the payment of a debt will convert the bondholder, who previously had been a drone, living upon his income, into an active man of business. In order to pay the debt the government collects capital from the taxpayers and hands it over to the bondholders in exchange for their bonds. These latter must then actively interest themselves in the investment of the capital thus repaid them, and in many cases must undertake the operation of new enterprises in order to safeguard it. Society is thus better off by this addition, forced though it be, to the number of productive workers. The existence of an idle class, supported by the proceeds of general taxation, is moreover a social menace, and the payment of the debt is thus socially desirable.

Another argument for debt payment has to do primarily with improvement debts, the proceeds of which have been applied to some capital investment, as sewers, street paving, schoolhouses, parks, etc. In these cases the property is subject to depreciation and will require ultimate replacement. If such debts were not paid within a reasonable time a situation would arise in which the property would have disappeared or lost its value, but society would still be paying interest for its use and the principal would remain as a burden upon the future. Not only does every consideration of equity and good finance demand that such a debt be paid, but economic and engineering considerations set a definite limit to the life of such a loan: it should in no case run longer than the economic life of the property to purchase which it was incurred. This would apply in the United States primarily to municipal and local improvement bonds.

For the payment of our national debt the argument is a political rather than a purely economic one. The debt is almost entirely a legacy of war, and this is even more true of the debts of other nations. Nothing is of greater value to a nation in time of war than unimpaired credit, and nothing impairs the national credit more than a heavy and permanent debt charge. If the adage, «in time of peace prepare for war» be true, it applies with especial force to the payment of a national debt at a rate as rapid as is consistent with sound economic development. It is a truism of modern war that success is determined largely by economic and financial strength. Here we have perhaps the most potent influence making for debt payment, though it must be admitted that hitherto it has not been very effective.

Methods of Debt Payment.— If it is decided that public debts ought to be paid, the further question arises as to the best manner of doing so. The oldest method is probably that of the sinking fund, which still finds expression in our national legislation on this subject. Probably the best known application of the principle of the sinking fund was made by Pitt in England in 1786, embodying a proposal put forward by a clergyman named Price. This scheme consisted in the inviolable appropriation of a fixed annual sum to the purchase of public obligations, which should be placed in a fund into which should be paid each year the interest accruing on these bonds. Each year additional bonds would be purchased and placed in the fund and the interest would thus be compounded until in time it would expunge a debt of any magnitude. Indeed the calculations of Dr. Price on this point seemed magical. The payments into the sinking fund were continued during the Napoleonic wars even though money had to be borrowed to do it. But the absurdity of this piece of fiscal machinery was exposed in 1813 by Dr. Robert Hamilton, and it was later estimated that between 1785 and 1829 the government had borrowed over £300,000,000 at 5 per cent in order to pay a debt bearing 4½ per cent interest. The scheme was thereupon abandoned and has never been resumed.

Another method of debt payment, which has been followed by England largely since the breakdown of the sinking fund policy, is that of annuities. If the public debt is thrown into this form, either as terminable or life annuities, the principal of the debt is automatically reduced as these fall in or mature. The objection to them is similar to the objection to the old sinking fund, that it commits the government to fixed annual payments whether these are convenient or not.

This criticism leads to the statement of the correct policy of debt payment, which consists in the establishment of a permanent appropriation beyond the annual interest charge. But such an appropriation must be out of surplus revenue and therefore cannot be «inviolable.» No automatic machinery can compel the extinction of a public debt unless there exists a clear net revenue to devote to that purpose. Considerable discretion must therefore be granted in the administration of a system of debt payment, for it must necessarily be suspended in periods of deficit. One favorable feature may be conceded to the sinking fund policy, which was that it committed a government definitely to the policy of debt payment. And to-day it has a place in local finance, where most of the debts are for purposes of improvement, and where accordingly it is essential that definite provision be made for debt payment. More recently, however, the principle of serial bonds has been adopted as a better and more economical, systematic and regular method of debt payment. See NATIONAL DEBTS OF THE WORLD.

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DEBTS, Right of a Wife to Contract. See HUSBAND AND WIFE.

DEBUSSY, Claude Achille, distinguished French composer: b. Saint-Germain-en-Laye, 22 Aug. 1862; d. 26 March 1918. He was educated at the Paris Conservatoire. From the time he was 12 years old he attracted attention as possessing remarkable musical ability. In 1884 he won the *Grand Prix de Rome* for his cantata «L'Enfant Prodigue.» Later compositions brought rebuke instead of commendation, for their departure from established forms. After a sojourn in Russia, where he assimilated the modes of the native music, Debussy returned to Paris and gave himself up to composition; but it was not until 1893 that he began to receive public recognition. In 1902 his opera 'Pelleas and Melisande' was produced in Paris, and from this time his fame and position were assured. Debussy has written profusely, not only dramatic music, but also a multitude of songs and pieces for piano and orchestra. While his work is refined, graceful and elegant to the highest degree, and his mastery of technique acknowledged to be perfect, it is claimed that his music is of the intellect rather than of the soul. It is also criticized as being too dependent for full interpretation upon the non-musical aid of the «programme.» Among his principal works are ‘La Mer’; ‘Printemps’; ‘Prelude á l'apres-midi d'un Faune’; ‘Petite Suite’; ‘Images’; ‘Ariettes oubliées’; ‘Trois Nocturnes’; ‘Cinq Poèmes de Baudelaire’; ‘Proses Lyriques.’

DÉBUT, dā-bü, a French word which has been adopted into the English language, signifying generally a beginning or entrance, but specially applied to the first appearance of an actor or actress on the stage, or to a first appearance in a particular theatre. In these circumstances, the actor is called *débutant;* the actress, a *débutante.* The expression is very frequently used with reference to a young lady's first entrance into society.

DECA (Gr. signifying «ten»), a prefix of frequent occurrence; as in *Decapolis,* a group of 10 cities; *decalogue,* the 10 commandments; *decametre,* a measure of 10 metres, etc. From *deca* is formed *decade,* a collection or group of 10. In the calendar of the French Republic the term decade was used to designate the week of 10 days, which were severally named *primidi, duodi, tridi, quartidi, quintidi, sextidi, septidi, octidi, nontidi,* and *decadi.* See CALENDAR.

DECACHORD, dĕk'a-kôrd (Gr. *dekachordos,* ten-stringed), an ancient Greek instrument of 10 strings, triangular in shape; also a kind of large guitar with 10 strings.

DECADE. See DECA.

DECADENTS, The, a school of artists and writers, the followers of which delight in the more or less morbid refinements of feeling and style, and pride themselves upon this perversion of taste. The decadent is fond of the products of declining civilization corrupted by many centuries of culture, of works too highly seasoned and vitiated, which presage the final dissolution of a social order fallen into decrepitude, and shuns the simple, the natural, the healthful, clinging only to the artificial and the complicated in life and character. The name of decadents may rightly be given to those who make a subtile virtuosity out of art. Among French writers Baudelaire was the first theorist of this school, and his influence was felt by many writers of the «end of the century,» such as the Goncourts and Maurice Barrès. The decadents' school of poetry is best represented by Stephane Mallarmé and Verlaine, and its disciples are numerous, including many men of undoubted talent who have combatted the stiffness and dryness of the Parnassians, not without success. They are often termed deliquescents and symbolists; the latter term is well chosen as indicating their aims and manner.

DECALOGUE. A term, from the Greek, corresponding to the Hebrew ‘Ten Words’ (Ex. xxxiv, 28; Deut. x, 4); in the Septuagint *οἱ δέκα λόγοι.* In the Pentateuch it appears in two versions (Ex. xx, 2-17 and Deut. v, 6-18) with some variants that have given rise to much discussion and criticism. The sources in the Bible describe it as embodying the statements of God on Mount Sinai; revealed to Moses and the people of Israel on the third month after the deliverance from Egypt amid thunder, lightning and heavy smoke. The Ten Words were written by Him on two tablets of stone (‘tables of testimony’ or ‘tables of the covenant’), and given to Moses. In his anger at the people's apostasy, Moses broke the tables (Ex. xxxii, 19), and later God commanded him to make two other tables like the first (Ex. xxxiv, 1), upon which to rewrite the Ten Words. In another passage, however (Ex. xxxiv, 27-28), Moses was ordered to rewrite and did rewrite the commandments himself; but in Deut. iv, 13, and other passages, God is the writer. Moses placed in the book (Ex. xxv, 16, 21, xl, 20) this second set brought down from Mount Sinai. The Ark was called, therefore, ‘Ark of the Testimony’ (Ex. xxv, 22; Num. iv, 5).

The Decalogue begins with the declaration in the first person that the speaker is Israel's God who led him out of Egypt and bondage. Hence no other gods shall be for Israel, and as a necessary corollary, no graven image or representation of anything shall be made as idol to bow down to and serve. The sin of idolatry is further enlarged upon as contrasting with the nature of the Deity, who while punishing the children for the sins of their fathers unto the third and fourth generation of those who hate God is merciful to the thousandth generation of those who love Him and keep His commandments. Next comes the prohibition against taking His name in vain, which is followed by the injunction to keep the Sabbath holy as a rest day from all work for man as well as beast, the stranger as well as the household. Honoring father and mother is the substance of the next commandment, and a reward is added — long life. In quick succession murder, adultery, theft, and false testimony are forbidden. The Decalogue concludes with a commandment against covetousness of anything that is one's neighbor's.

The differences in the two versions of the Decalogue form an interesting chapter in the critical study of the Pentateuch. While there is no essential variation so far as vital obligations are concerned, verbal changes occur and in one instance, that of the Sabbath, an entirely different reason is adduced for its observance. The slight variants in the Masoretic text, occasional differences in words, as for instance «covet» for «desire,» «remember the Sabbath» in one case and «keep» in the other, and «false witness» in one and «a witness of deceit» in the other; some additions and amplifications, all this has been explained as due to carelessness on the part of transcribers, who trusted to their memory. But the variation in the reason alleged for the Sabbath cannot be so readily explained. The Exodus version connects it with creation; that of Deuteronomy associates it with Israel's release from Egyptian slavery. In the one case, the universal, in the other a national historical element. One can understand how the critics of the different schools analyze these variants to discover which text is the earlier. The difficulty is less felt by the early rabbis who claim both versions to be alike of divine origin and spoken at the same time. The division of the Decalogue is another subject of inquiry. As it was written on two tablets of stone and on both sides, its arrangement would have been naturally one group of five «words» each on one stone. So, in fact, is the statement as to the original division made by Josephus (‹Antiquitates› Vol. III, 5, 4) and by Philo (‹De Decalogo› 12) the first group of five including the commandments referring to our relation to God and the second referring to our conduct toward our neighbors. Another variation is to be noted. The sequence of certain of the «words» differs in various versions. The Masoretic text, Josephus, the Syriac Hexapla agree as to the order of the prohibitions against murder, adultery, and theft, but the Septuagint, Codex Alexandrinus and Ambrosianus have the sequence of «murder, theft, and adultery,» while Philo has the order «adultery, murder, theft,» and the Codex Vaticanus «adultery, theft, murder» — slight variations, it is true; but in so fundamental a code as the Decalogue one would expect in every version uniformity throughout. No less peculiar is the diversity in the numbering of the different commandments. According to the Jewish tradition, Ex. xx, 2, forms the first «word,» while verses 3–6 constitute the second. The Codex Vaticanus of the Septuagint and the Deuteronomy of Ambrosianus have a similar arrangement. Josephus and Philo regard verse 3 as first, verses 4–6 as second, verse 7 as third, verses 8–11 as fourth, verse 12 as fifth, verse 13 as sixth, verse 14 as seventh, verse 15 as eighth, verse 16 as ninth and verse 17 as tenth commandment. The Roman Catholic and Lutheran rule combines verses 3–6 into the first, and every commandment is advanced by one to the last, the traditional Jewish «tenth» being divided into ninth and tenth, to maintain the traditional number. In the exegetical and philosophical writings of the early and mediæval rabbinical authorities, the Decalogue plays an important part — piety, mysticism and ingenuity alike enter into their interpretations. A point that aroused much dispute was the relation of revelation to the Ten Words. Was the Decalogue exclusively essential compared to the rest of the Law? In the daily liturgy in early Talmudic times the recital of the Ten Words was a special feature, but later withdrawn to silence the inference that the Decalogue alone had been revealed by God on Mount Sinai (Berak. 11a).

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Abram S. Isaacs.

DECAMERON, The. In the year 1348 the plague, which had been for some time devastating the East, appeared in «the notable city of Florence.» A hundred thousand persons perished. Boccaccio in the first part of his work, after his immortal description of the ravages of the pestilence, exclaims: «Alas, how many great palaces, how many goodly houses, how many noble mansions, once full of families, of lords and ladies abode empty even of the meanest servants! How many memorable families, how many ample heritages, how many famous fortunes were seen to remain without lawful heir! How many valiant men, how many fair ladies, how many sprightly youths whom not others only but Galen, Hippocrates or Æsculapius themselves would have judged most hale, breakfasted in the morning with their kinsfolk, comrades and friends and that same night supped with their ancestors in the other world!» Boccaccio tells us how at seven o'clock of a Tuesday morning it chanced that seven young ladies, all knit to one another by friendship, neighborhood or kinship met in the venerable church of Santa Maria Novella for divine service: «Each was discreet and of noble blood and well-mannered and full of honest sprightliness.» He does not give their actual names but applies to them fictitious designations corresponding to their qualities. The eldest is called Pamfinia, «the all-admonishing»; there is Fiammetta, known to be the Princess Maria, illegitimate daughter of King Robert of Naples, for whom Boccaccio cherished a «very high and noble passion.» The others are Filomena, the «Nightingale,» Emilia, Lauretta, the «laurel-crowned,» Neifile, the «novelty-loving,» and Elisa. They propose to flee from the death-stricken city and go to the country: «There,» they say, «we may hear the small birds sing; there we may see the hills clad all in green and the fields and plains full of corn wave even as doth the sea; there may we see trees, a thousand sorts, and there is the face of heaven more open to view, the which angered against us though it be, nevertheless denieth not unto us its eternal beauties, far goodlier to look upon than the empty walls of our city. Moreover, there is the air far cooler.»

While they are discussing how best to go, three young men enter — Pamfilo («Perfect in Love»), Filostrato («Unhappy in Love») and Dioneo («The Amorous»), «all very agreeable and well-bred, of worth and discretion.» The ladies invite the young men to accompany them, and the next day with a train of servitors of every kind they repair to a place two miles from the city, on a little hill back from the road where stands a palace with courtyard and loggie and saloons and bedrooms, abounding in costly paintings, with wells of cool water and cellars full of rare wines. They organize their sessions in the most formal manner with the design of «living merrily.» Each member of the party must take turns in being «King or Queen of the day.» Pamfinia is chosen to be first and is crowned with «a goodly and honorable wreath» of laurel-leaves. Each servant has an appropriate name and a set task: Parmeno is seneschal and has charge of the chief saloon; Sirisco is purveyor and treasurer; Misia and Lirisca take charge of the kitchen; there are others in charge of the bed-chambers. They stray about till dinner; then they find the tables laid with snowy cloths and glittering with silver; the viands are delicious, they have the choicest wines. Dinner is followed by music and dancing: Dioneo plays the lute, Fiammetta the viol.

At three in the afternoon, after their siesta, they go to a little meadow of green grass and the daily session of story-telling begins. The «Queen» calls upon each in turn and one story suggests another, but each is «free to tell of such matters as are most to his liking.» On the Second Day Filomena assigns a general topic: «of those who after being baffled by divers chances have won at last to a joyful issue beyond their hope.» Friday and Saturday they have no general gathering, but begin again on Sunday, which is devoted to tales of «such as have by dint of diligence acquired some much desired thing or recovered some lost good.» It is rather odd that the stories on this Third Day, whether told by the three young men or by the seven young ladies, rival one another in not merely veiled vulgar allusions but in broad farcical obscenity. This tone is carried on in the stories of the Fourth Day which is ordained by Filostrato, when they all discourse of those whose loves had unhappy endings. Fiammetta is «Queen» for the Fifth Day, and she proposes for the topic the happy fortunes of lovers who had suffered sundry cruel and misfortunate adventures. Elisa is «Queen» for the Sixth Day, and commands discourse of such as had extricated themselves from perilous or unpleasant predicaments by some ready reply or device. On this occasion most of the stories are mere anecdotes, and it is the shortest part of the 'Decameron.' The Seventh Day, guided by Dioneo, is devoted to relating the tricks played by wives on their husbands for their own preservation. The Eighth is a sort of continuation of the preceding, treating of the tricks that all day long women play upon men or men upon women or men upon one another. This again comes on a Sunday, and many of the stories are long and exceedingly obscene. Emilia offers no set topic for the Ninth Day, and they all follow their own impulses. The Tenth and last Day is under the lordship of Pamfilo, and the company discourse of such persons as have wrought generously or magnificently in matters of love or in any other way. 'The Decameron' ends with an apology for the author's license «in inditing these stories as well as in making ladies now and then say and very often hearken to things not very seemly to be said or heard of modest women.» He defends himself by saying: «There is nothing so unseemly as to be forbidden unto anyone, so but he express it in seemly terms, as methinks I have here very aptly done»; and he goes on to argue at some length that no harm can come to any one who reads the stories in the right spirit; and says naïvely that while it is perfectly true that some might well have been omitted, yet he had to tell them as his little company of 10 told them at their daily sessions. Boccaccio did not invent the hundred stories; many of them are folk-tales which had been in vogue for centuries. He merely retells them in a style which has been the admiration of the world, although in many places it is marked by strange obscurities, by affected attempts at «Ciceronian concision,» by imitations of Dante's symbolism and by the use of words of unfamiliar significances. There are beautiful descriptions; there is broad wit; there is farce; there is pathos, as in the famous story of the Patient Griselda. Some of the stories are elaborations of the anecdotes of the «Gesta Romanorum;» but Boccaccio makes no attempt to attribute them; he took whatever he wanted wherever he found it and made it his after the manner of the famous conquerors of the world. Attempts have been made to locate the deserted villa where the *lieta brigata* first took up their abode and that to which they moved after the Second Day as being more commodious and magnificent. The one is considered to have been the Poggio Gherardi; the other, judging from the famous description of its surroundings, was the Villa Pasolini or Rasponi, at that time the property of the Memmi, the pupils of Giotto, overlooking the valley which in the last century belonged to the American, Prof. Willard Fiske.

Each of the stories is introduced by a vignette in words, describing the activities of the gay little company; all of the characters are vividly depicted and artfully contrasted. Their behavior is in deliberate contrast to the freedom of their speech, and when there is some talk about a scandal arising from their sojourn together Filomela replies to Neifile: «That amounts to nothing, where I live virtuously and my conscience in no wise reproaches me; let those who will speak against me: I take God and the Truth for my defence.»

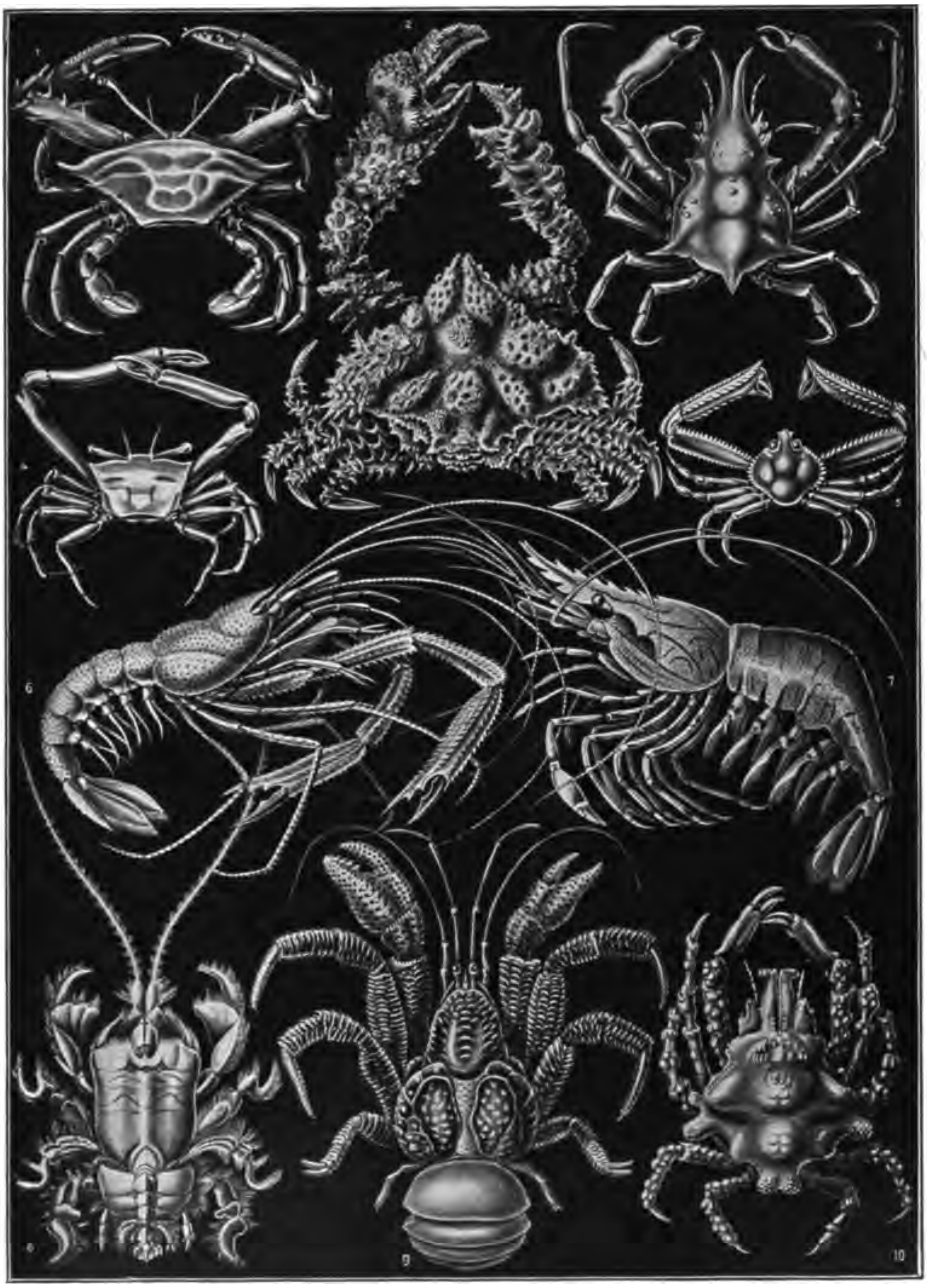
Some of the stories have been retold in modern times; others have been elaborated into plays. Washington Irving used that of «Frederick of the Alberighi and his Falcon.» Keats put into immortal verse the «Pot of Basil.» Chaucer, who died only a quarter of a century later than Boccaccio, imitated him and used his material. In spite of the indelicacy of many of the stories the work, as a whole, is one of the classics of world literature. It has been frequently translated in expurgated form; complete it is to be found in three volumes translated into rather stilted and affected English by James Payne and published in 1886 by the Villon Society for private circulation. Consult Bartoli, Adolpho, 'I Precursori del Boccaccio e alcune delle sue Fonti' (Florence 1874); Lee, A. Collingwood, 'The Decamerone, its Sources and Analogues' (London 1909); Symonds, J. A., 'Giovanni Boccaccio' (London 1895); Moutier, Ignazio, 'Il Decamerone, con spiegazioni tratte dai migliori commentari' (Paris 1849): Morley, Henry, 'Il Decamerone, Forty of the 100 Novels with Introduction' (1902 and 1909); also the edition by Dr. Guilio Farrario with notes from the best editions (Florence 1841).

NATHAN HASKELL DOLE.

DE CAMP, John C., American naval officer: b. New Jersey, 5 Oct. 1812; d. Burlington, N. J., 24 June 1875. He entered the navy in 1827; served in the frigate *Constitution* off the coast of Africa in 1854, and received the rank of commander the next year. During the Civil War he had command of the steam sloop *Iroquois* in the attack on Fort Jackson and Fort Philip, and served on the Mississippi under Farragut, distinguishing himself especially at Vicksburg. In 1868-69 he commanded the receiving ship *Potomac,* and was retired in 1870 with the rank of rear-admiral.

DE CAMP, Joseph Rodefer, American figure and landscape painter: b. Cincinnati, Ohio, 5 Nov. 1858. He studied there under Duveneck and at the Royal Academy of Munich. He established himself in Boston in 1893, and became an instructor in the school of the Boston Museum of Fine Arts. He was elected to the Society of American Artists in 1888. He received the Temple gold medal from the

DECAPOD CRUSTACEA



1 An East Indian edible crab (Podophthalmus vigil)
2 East Indian sping crab (Parthenope horrida)
3 A Mediterranean crab (Pisa armata)
4 Three-angled Mediterranean crab (Gonoplax rhomboides)
5 Three-angled Atlantic crab (Pisolambrus nitidus)
6 East Indian shrimp (Stenopus hispidus)
7 Northern shrimp (Palaemon serratus)
8 A Mediterranean porcelain crab (Albunea symnista)
9 Cocoanut crab (Birgus latro)
10 Mediterranean purple crab (Lissa chiragra)

Pennsylvania Academy of Fine Arts in 1909; honorable mention at the Paris Exposition of 1900 for a 'Woman Drying Her Hair,' and a gold medal at the Saint Louis Exposition in 1904. He created great enthusiasm in Berlin in 1910 with 'An Interior' and 'A Lady Playing a Lute.' Has painted a great many prominent Americans and was award Beck portrait medal at Philadelphia in 1911. Notable works are in the Cincinnati and Worcester museums.

DECAMPS, dê-kän', **Alexandre Gabriel,** French painter: b. Paris, March 1803; d. Fontainebleau, 23 Aug. 1860. He was educated in the studio of Abel de Pujol. When a young man he made a journey to the East, and returned from thence with a collection of sketches, from which he afterward produced some of his finest pictures. Among the more celebrated of these are 'The Grand Bazaar'; 'Relieving Guard at Smyrna'; 'A Turkish Café'; 'Turkish Children Going Out of School'; and 'Arab Horsemen Passing a Ford.' Of pictures of another class are 'The Shepherd and His Flock Overtaken by a Storm'; 'An Italian Village'; 'The Hawking Party'; 'Spaniards Playing at Cards'; 'Don Quixote and Sancho Panza.' Decamps also produced some historical and sacred pictures of a high order of art, including the 'Defeat of the Cimbri'; 'The Miraculous Draught of Fishes'; 'Joseph Sold by His Brethren'; 'The Finding of Moses,' and others. The leading merits of this painter are great originality of conception and vigor of expression, with a wonderful skill in the treatment of light and shade. He was made chevalier of the Legion of Honor in 1839. He was extremely sensitive and conscious of his departure from classical tradition, and he abandoned art for many years. Consult the monograph by Moreau; Chesneau, 'Movement moderne en peinture: Decamps' (Paris 1861); Stranahan, 'Modern French Painters' (New York 1888).

DE CANDOLLE, Augustin Pyrame, Swiss botanist: b. Geneva, 4 Feb. 1778; d. there, 9 Sept. 1841. He studied chemistry, physics and botany in Paris, where in 1797 his earliest work, on lichens, was published. Other works quickly followed, including his 'Astragalogia' (1802) and his valuable 'Historia Plantarum Succulentarum.' In 1802 he was elected to an honorary professorship in the Academy of Geneva, but remained in Paris, and delivered his first botanical lectures in the Collège de France in 1804. His 'Flore Française' appeared in four volumes in 1805. Employed by the government, he visited all parts of France and Italy in 1806–12, investigating their botany and agriculture. The results of his journeys are partly embodied in a supplement to the 'Flore.' He was appointed in 1807 to a chair at Montpellier, where he lived from 1810 to 1816; he then retired to Geneva, where a professorship of botany was founded for him and where he spent the remainder of his life. De Candolle was an industrious writer, and the fruits of his studies in systematic botany and the properties and natural affinities of plants are embodied in a considerable number of works. The greatest of these, his 'Regni Vegetabilis Systema Naturale' (Vols. I and II, 1818–21), was commenced on too grand a scale, and was continued within more reasonable limits in the 'Prodromus Systematis Regni Vegetabilis' (17 vols., 1824–73, the last 10 by his son and others).

DECAPODA, an order of malacostracous *Crustacea* (q.v.), in which the fourth to the eighth pairs inclusive of the thoracic appendages form uniramous walking limbs; the head and thorax are united to form a cephalothorax and the eyes are stalked. Three sub-orders are usually recognized: (1) The *Macrura,* in which the abdomen is not permanently flexed beneath the thorax, but forms a long, powerful swimming organ terminated by a so-called caudal fin; (2) the *Brachyura,* having the abdomen much reduced in size and permanently flexed beneath the thorax, which is usually shorter than its width, while the antennæ and antennules are much reduced in size. The crab is typical of this group. (3) The *Anomura,* or hermit crabs and their allies, with soft, usually asymmetrical abdominal segments. See Crab; Lobster; Hermit Crab.

A sub-order of cephalopods (q.v.), containing those forms with five pairs of tentacles, is also known as *Decapoda.* It comprises the squid, cuttle-fish, the fossil belemnites, the giant cephalopods of the ocean and other related forms. See Cephalopods.

DECAPOLIS, The. The name of a Greek confederation of cities east of the river Jordan. After the conquests of Alexander the Great many Greeks settled in Palestine, many going to the country east of the Jordan. The confederation was formed after the death of Herod in 4 B.C. Some of the cities had been free but had been deprived of their freedom by the Jewish Maccabean princes. Later Pompey restored their freedom to them. Their civic eras dated from the year 64–63 B.C., the year of Pompey's campaign in the country. As the Latin name signifies the confederation included 10 cities at first. Later other cities joined the league, until there were 18 members of the league from first to last. It was formed for protection against Semitic influences hostile to them. Scythopolis was the only city west of the Jordan. It was included in the league because of its strategic situation which commanded the route to the Greek cities on the seacoast and to the sea. The rest were east of the Jordan and southeast of the Sea of Galilee. The other nine original cities were Gadara, Hippos, Pella, Dion, Gerasa, Philadelphia, Raphana, Kanatha and Damascus. Those added later were Abila, Kanata, Kapitolas, Edrei, Boasra and three of their neighbors not named. Each city controlled the territory in the surrounding country. Jesus Christ entered the land of the Gadarenes and performed a miracle there (Mark v, 1–20). His demon-possessed patient published the news of his cure in all Decapolis. The cities were usually built for defense and were located on a hill or mound and near some stream or body of water. Many of the streets were colonnaded. In the ruins of Gerasa, one of the richest of the cities, nearly 200 of these columns are still standing, and at Philadelphia about a dozen still remain. Some of the cities had two amphitheatres each. The largest was at Philadelphia, which would possibly seat 7,000 people; the others would accommodate from 2,000 to 4,000 spectators. Some of the cities also had artificial lakes on which sham sea-fights were staged.

Each city had its own annual festival for athletic games. The temples were beautiful. In each was a central hall ranging in size from 50 to 70 feet in length and from 30 to 50 feet in width. The religion of the homeland prevailed. Gadara was an important town before the time of the fall of Jerusalem. Vespasian captured it and destroyed most of the inhabitants. Josephus was the Jewish general in command and was made a prisoner and taken to Rome. The site of Pella has been explored and a volume published by the Palestine Exploration Fund containing the results. Kanatha occupied the site of the city of Kenath mentioned in the Old Testament. The sites of some of the other cities remain undiscovered by modern archæologists. These cities were centres of literary activity. From Gadara came «Philodemus the Epicurean, a contemporary of Cicero, Meleager the epigrammatist, Menippus the satirist, Theodorus the rhetorician, the tutor of Tiberius, and others. Gerasa also was the mother of teachers. Stephanus Byzantinus mentions three, Ariston, Kerykos and Plato.» The cities flourished most during the period of the Antonines. It was then that Gerasa reached the height of her glory. For fuller details the reader is referred to ‹The Historical Geography of the Holy Land› by George Adam Smith, to which we acknowledge indebtedness for many of the facts of this article.

DECATUR, Stephen, American commodore: b. Newport, R. I., 1751; d. Philadelphia, 14 Nov. 1808. During the war of the American Revolution he commanded several privateers and acquired some reputation by the capture of English ships. At the commencement of hostilities with France in 1798 he was appointed to the command of the *Delaware,* of 20 guns, in which ship he cruised during the years 1798–99 on the American coast and in the West Indies, capturing at different times the French privateers *Le Croyable* of 14, and *Marsuin* of 10, guns. In 1800 he commanded a squadron of 13 sail on the Guadeloupe station, the *Philadelphia,* a frigate of 38 guns, being his flagship.

DECATUR, Stephen, American commodore: b. Sinepuxent, Md., 5 Jan. 1779; d. Washington, D. C., 22 March 1820. He was the most conspicuous figure in the naval history of the United States for the 100 years between Paul Jones and Farragut. He was well educated at the Episcopal Academy and at the University of Pennsylvania. Refusing a clerical life, in 1796 he entered the counting house of a firm of ship owners. In 1797 he got out the keel pieces of the frigate *United States* and was on her when she was launched, the first ship of the United States Navy. Through the instrumentality of Commodore John Barry he was appointed a midshipman in the navy by President Adams, 30 April 1798. He cruised in the West Indies during the French War in the *United States,* taking part in various minor naval actions. Such was his aptitude and ability that he was commissioned lieutenant, 3 June 1799. At the outbreak of the Tripolitan war, in command of the schooner *Enterprise,* he captured the bomb ketch *Mastico,* 23 Dec. 1803. In this ketch, renamed the *Intrepid,* he destroyed the frigate *Philadelphia* in the harbor of Tripoli by a singularly bold stroke.

On 3 Aug. 1804 Decatur commanded the American gunboats in their attack on the Tripolitan flotilla. He captured two gunboats by the most desperate hand-to-hand fighting in a battle which has been called the «biggest little fight in history,» and well merits the name. He took part in four other attacks on Tripoli with his usual distinction. For the burning of the *Philadelphia* he was commissioned a captain, and at the age of 25 was placed in command of the frigate *Constitution.* At the close of the war he returned home, having divided with Commodore Preble the honors of the campaign.

On 8 March 1806 he married Miss Susan Wheeler of Norfolk, Va. He had no children, and his wife survived him many years. At the outbreak of the War of 1812 he was in command of the *United States,* in whose building he had assisted, on which he had been launched, and in which he had made his first cruise. On 25 Oct. 1812 the *United States* captured the British frigate *Macedonian,* which was dismasted and almost cut to pieces. She lost 35 per cent of her complement, or 89 killed or mortally wounded, and 15 severely wounded, besides many others slightly wounded. On the American ship seven were killed or mortally wounded, and five severely wounded. The *United States* was practically intact. The weather remained favorable and by strenuous work for two weeks the *Macedonian* was patched up and brought back to New York, the only trophy of the great frigate actions of the war that remained afloat. The disparity in force in favor of the United States was about 7 to 5, in damage inflicted about 9 to 1.

After being blockaded in New London for a year Decatur took command of the frigate *President.* On the night of 14 Jan. 1815, in the midst of a howling gale, he put to sea from New York. On the morning of the 15th, off the eastern end of Long Island, he fell in with a British squadron of five heavy ships. Every effort was made to escape, but in the afternoon the *President* was brought to by the frigate *Endymion.* A running fight ensued until 6 o'clock, when Decatur attempted to lay the *Endymion* aboard, hoping to capture her, scuttle the *President* and escape on the British ship, but the *Endymion* had the heels of the *President* and avoided the manœuvre. For two hours the vessels sailed side by side in furious conflict. At the end of this time the *Endymion* was entirely silenced. She had been fought to a standstill. Decatur could not take possession for fear of the other ships. He tried running again, but the *President* had been severely injured in the battle, and about 11 o'clock she was overhauled by two British frigates, which ran alongside and opened fire. The British flagship was also in range and the last ship was coming up rapidly. The *President* had lost 24 killed and 55 wounded, including most of her deck officers. Decatur himself had been twice wounded. Further conflict with two fresh ships was hopeless. Decatur reluctantly struck his flag and surrendered to the commodore of the squadron. He was court-martialed for the loss of his ship, and acquitted of any misconduct in words of the highest commendation.

After the close of the war he was placed in command of a squadron and sent to the Barbary States to exact reparation for injuries and to enforce treaties of peace. His squadron captured the Algerine frigate *Meshouda* and the brig *Estedio* on 17 and 19 June. On 30 June 1815 he exacted submission and peace from the Dey of Algiers; on 26 July the same from the Bey of Tunis; and on 7 August the same from the Bashaw of Tripoli. The treaties were made at the mouth of the cannon and indemnities demanded were paid immediately.

In 1816 he was appointed naval commissioner. On 22 March 1820 he was killed in a duel with Commodore James Barron. The cause of this duel arose from certain strictures which Decatur passed on Barron. Barron had been suspended for his conduct on the *Chesapeake* when she was attacked by the *Leopard* in 1807. He had not returned to the United States during the War of 1812 but had remained in England, where he claimed to have been imprisoned for debt. When he applied for reinstatement after the close of the war Decatur opposed his request. He need not have entertained Barron's challenge save for a too nice sense of honor. He is buried in Saint Peter's church-yard, Philadelphia.

Loyalty to his country was the very breath of life to Decatur. Our judgment does not entirely approve the ethic significance of his famous sentiment, "My country — may she ever be right, but, right or wrong, my country"; but our affections tend to make the sentiment our own. There is a ring of sincerity in the words and in him which wins us in spite of all. His nephew, STEPHEN, b. 1815; d. 1876, was also a commodore in the United States Navy.

Consult Brady, 'Decatur'; Mackenzie, 'Decatur'; 'Autobiography of Commodore Morris'; Allen, 'Navy and Barbary Corsairs'; various naval histories.

CYRUS TOWNSEND BRADY.

DECATUR, Ala., city, county-seat of Morgan county, on the Tennessee River and the Louisville and Nashville, and Southern railroads, 75 miles north of Birmingham. It has extensive manufactures of agricultural implements, engines, foundry products, lumber, sash and blinds, furniture, iron, flour, cotton, cottonseed oil, fertilizer and leather. Its chief buildings are the new post office, city hall, Carnegie library, schoolhouses, hospital and infirmaries. Pop. 5,500.

DECATUR, Ga., town, county-seat of De Kalb County, on the Georgia Railroad, six miles east of Atlanta. Decatur was settled about 1822 and is governed by a mayor and a council of six members elected by popular vote. It is connected with Atlanta by two electric street railroads, and is the seat of the Agnes Scott Institute for young ladies and the Donald Fraser School for boys. A battle was fought here 20 July 1864 between a portion of Sherman's army, under General Thomas, and the Confederates under General Hood, the latter retreating at nightfall. Pop. 3,000.

DECATUR, Ill., city and county-seat of Macon County, near the Sangamon River, and on the Wabash, the Illinois Central, the Cincinnati, Hamilton and Dayton and the Vandalia railroads, 173 miles southwest of Chicago and 38 miles east of Springfield. It was settled in 1830 and in 1836 was incorporated. Decatur is in the midst of the famous Illinois corn belt and is the trade centre of several counties. The chief manufacturing establishments are corn mills, railroad shops, iron works, flour mills, planing mills, agricultural implement works, engine and boiler works, casket and coffin factories, bridge works, electric-light fixtures, cornsheller, waterworks equipment, starch factories, soda fountain works and mantle factories. The United States census of manufactures for 1914 recorded for Decatur 126 industrial establishments of factory grade, employing 4,988 persons, of whom 4,003 were wage earners, receiving $2,326,000 annually in wages. The capital invested totaled $12,550,000, and the year's output was valued at $11,957,000; of this $5,291,000 was the value added by manufacture. The city has a large trade in grain, coal, livestock and manufactured products.

The principal public buildings are the government building, the county courthouse, the municipal buildings, a Carnegie library, home for aged and orphans, Saint Mary's Hospital, the churches (about 25 buildings) and the schools. There is a good system of public schools, including a well-equipped high school. There are two parish schools. The principal departments of the James Milliken University are located here. There are three national banks. The government is by commission since 1911. The city owns and operates the electric-light plant and the waterworks. Lincoln received his first endorsement as presidential candidate at the Illinois Republican Convention held here on 6 May 1860. Decatur is also the birthplace of the Grand Army of the Republic, Post 1 having been organized here on 6 April 1866. Pop. 37,825.

DECATUR, Ind., city, county-seat of Adams County, on the Saint Mary's River, and the Grand Rapids and I., Toledo, S. L. and K. C. and Erie railroads, 20 miles southeast of Fort Wayne, and near the eastern boundary of the State. Its principal industries are the manufacturing of lumber, brick and machinery, and stone quarrying. It has municipal water and lighting plants, a Carnegie library and a Knight of Pythias home. Decatur was settled in 1840 and incorporated in 1882. Pop. 5,000.

DECATUR, Mich., town of Van Buren County, on the Michigan Central Railroad, 24 miles southwest of Kalamazoo. It is in a rich farming section and has an important trade in grain, fruit, celery and peppermint. The industries are a large measure works, novelty factory, foundries, and manufactures of flour, stoves, etc., and two grain elevators. Pop. 1,500.

DECATUR, Tex., city, county-seat of Wise County, on the Fort Worth and Denver Railroad, 45 miles northwest of Fort Worth. The town, which has municipal waterworks and electric-lighting plant, is the trade centre of an agricultural region and its industries are chiefly those of a cotton-growing country, with the quarrying of limestone. The Northwest Texas Baptist College is located here. Pop. 2,000.

DECAZES, dė-käz', **Elie**, Duc, French statesman: b. Saint Martin du Laye, Gironde, 28 Sept. 1780; d. Decazeville, France, 25 Oct. 1860. He gained the confidence of Louis Bonaparte, king of Holland, whom he served even after his abdication in 1810; but joined the cause of the Bourbons in 1814 and under the second restoration discharged the duties of Prefect of Police at Paris with marked ability. In 1818 he became Home Minister, and in November 1819 Premier. After the assassination of the Duke de Berry in 1820 he resigned and Louis XVIII made him a duke and his Ambassador to England, where he remained till December 1821. Under the reign of Charles X he opposed the extreme measures of the government, and after 1830 adhered to Louis Philippe. From 1834–48 he was grand referendary of the peers. Consult Daudet, E., ‹Louis XVIII et le duc Decazes› (Paris 1899).

DECEASED WIFE'S SISTER MARRIAGE BILL, a bill to legalize marriage between a man and the sister of his deceased wife that was brought up in almost every session of the British Parliament after 1835, when Lord Lyndhurst secured the passing of a bill which declared all such marriages null and void. The bill legalizing marriage with a deceased wife's sister passed the House of Commons several times, but till 1896 was invariably rejected in the House of Lords, with, however, decreasing majorities. In 1896 the bill was passed by the Lords, but went no farther. The Colonial Bill, passed in the House of Commons more than 20 years ago and in the House of Lords during the session of 1898, to make marriages of this class legally contracted in the colonies legal also in England, and the Scotch Bill, having a similar object, also was never carried, though there were not wanting high authorities who pronounced such marriages legal in Scotland even without any special permissive legislation. It may be added that marriage with a deceased wife's sister was specially legalized under the sanction of the Crown in all the Australian colonies, in Canada, Barbados, Ceylon, Mauritius, New Zealand, South Africa and Jersey. Bills similar to the English bill were also passed in Natal. These were, however, refused ratification (by the Crown) for special or technical reasons. Throughout India marriages of this kind were universally legal among all sects and creeds, except British subjects whose domicile was in Great Britain. In every Christian country, except Great Britain, such marriages were legal; and at last, despite the opposition and subsequent refusals of the High Church party to recognize the fact, marriage with a deceased wife's sister was rendered legal by the Act of 1907. The marriage of a woman with her deceased husband's brother, however, is still illegal, and the Act forbids the marriage of a man with the sister of his *divorced* wife during the wife's lifetime.

DECEIT, in law, the misleading of a person as to material facts, with the intention of fraud and to his damage. It has been held by the courts that erroneous and misleading statements without the intent to defraud, but as a consequence of neglect of the duty of knowing the truth as to such statements, has amounted to deceit. Deceit is recognized as a sufficient ground for the voiding of contracts, and as foundation for suit for damages.

DECEMBER, the 12th month of our year, from the Latin *decem,* 10, because of the Roman year instituted by Romulus it constituted the 10th month, the year beginning with March. In December the sun enters the tropic of Capricorn and passes our winter solstice. This month was under the protection of Vesta.

DECEMBRISTS (in Russian «Dekabristy»), name given in Russian history to the members of various secret societies which were formed in Russia during the reign of Alexander I, beginning in 1816, and rising in open insurrection on 14 Dec. 1825. The failure of Alexander I to put into effect his humanitarian ideals which he had promised to the people before his accession to the throne, and the utter inability of Count Arakchew, into whose hands passed the administrative power, to understand the needs and wishes of the people, caused a great dissatisfaction amongst the people and a secret society was formed under the name «Soyuz spaseniya» («Union for Salvation») Among the founders of this union were several grand dukes, high officers of the army and the civil service. The main objects of that society, as expressed in its constitution, were to endeavor by all means and available forces and for the general good to maintain the mild and honorable measures of the government, to prevent all evils and crooked actions on the part of the officials, etc. But its most secret and sacred ideal was to introduce in Russia a parliamentary system of government. In 1818 the society adopted another name *Soyus Blagodenstviya* («Union of Prosperity»). During the coronation of Emperor Nikolas Pavlovich the Decembrists, profiting by the interregnum that preceded and the military disorder, proclaimed Prince Trubetzkvy dictator of Russia, with the aim of effecting a revolution and establishing a republican form of government. But Trubetzkvy declined autocratic power; the revolution broke out, however, on 14 Dec. 1825, and was immediately suppressed and the ringleaders were summarily dealt with.

DECEMVIRS, (1) the 10 men appointed to codify the laws of ancient Rome. Commissioners were sent to Greece to study Greek statute law and on their return (451 B.C.) all the magistracies were suspended and a commission of 10 patricians (*decemviri legibus scribendis*) appointed, with consular powers to reduce the laws to writing and to govern the state during their term of office. The finished code, after being ratified by the comitia of the centuries, was erected in the Forum inscribed on 10 tables of wood. Next year the decemvirate was renewed and added two tables. The whole code was known as the Twelve Tables (q.v.). The president of both the decemvirates was Appius Claudius (q.v.). They resigned in 447 B.C. and the usual magistracies were restored. (2) The *decemviri sacris faciundis* were members of a sacred college, appointed for life, whose duty it was to take care of the Sibylline books and to celebrate the feasts of Apollo.

DECHAMPS, dė-shän′, **Adolphe,** Belgian journalist and statesman: b. Melle, 17 June 1807; d. near Brussels, 19 July 1875. Early in life a disciple of Lamennais, he subsequently became an orthodox Roman Catholic. From 1843 to 1845 he was Minister of Public Works, and from 1845 until August 1847, when the triumph of the Liberal party led to his secession, Minister of Foreign Affairs. From 1837 to 1851 he conducted the Catholic *Revue de Bruxelles,* founded by himself and Dedecker. He was an able administrator and an influential parliamentary speaker. He was the author of ‹L'Empire et l'Angleterre› (1860); ‹La France et l'Allemagne' (1865); 'Le Prince de Bismarck et l'entrevue des trois empereurs' (1873).

DECIDUOUS (Lat. *deciduus*, that falls down, from *decidere*, fall down, from *de*, down + *cadere*, fall), in botany, a term applied to various organs of plants, particularly leaves, to indicate their annual or periodic fall. When the calyx of a flower falls with the corolla it is called deciduous; when it falls on the expansion of the flower it is called caducous. Deciduous trees are those which for the most part annually lose and renew their leaves. See DURATION.

DECIDUOUS TEETH. See TEETH.

DECIMAL ARITHMETIC, the common system of arithmetic, in which the figures or digits ranged in a row increase in value by being multiplied by 10 as they are read from right to left, and decrease at a similar ratio from left to right. Also that part of the science of numerical calculation which treats of decimal fractions. See FRACTIONS.

DECIMAL FRACTION, a fraction whose denominator is a decimal or power of 10. Thus $\frac{1234}{100}$ is a decimal fraction. It may be decomposed into the sum

$$\frac{1000}{100} + \frac{200}{100} + \frac{30}{100} + \frac{4}{100}$$
$$= 10 + 2 + \frac{3}{10} + \frac{4}{100}$$

By an obvious extension of the method of local values, where each digit has 10 times the value of the like digit, which immediately succeeds it, the above decimal fraction may clearly be written more concisely in the form 12.34, where the decimal point after the 2 merely serves to indicate which digit represents units.

In this abbreviated form a decimal fraction is termed a decimal. The operations of addition, subtraction, multiplication and division may be applied to decimals in exactly the same manner as to integers; hence their great utility. They present, nevertheless, this disadvantage, that comparatively few fractional quantities or remainders can be exactly expressed by them; in other words, the greater number of common fractions cannot be reduced, as it is called, to decimal fractions, without leaving a remainder. Common fractions, such as $\frac{1}{2}$, $\frac{2}{3}$, $\frac{1}{4}$, $\frac{3}{7}$ and $\frac{9}{25}$, for instance, can be reduced to decimal fractions only by multiplying the numerator and denominator of each by such a number as will convert the denominator into 10, or 100, 1,000, etc. (The common process is merely an abridgment to this). But that is possible only when the denominator divides 10 or 100 without remainder. Thus, of the above denominators, 2 is contained in 10, 5 times; 4 in 100, 25 times; and 25 in 100, 4 times; therefore.

$$\frac{1}{2} = \frac{1 \times 5}{2 \times 5} = \frac{5}{10} = .5; \quad \frac{1}{4} = \frac{1 \times 25}{4 \times 25}$$
$$= \frac{25}{100} = .25; \quad \frac{9}{25} = \frac{9 \times 4}{25 \times 4} = \frac{36}{100} = .36$$

But neither 3 nor 7 will divide 10 or any power of 10; and therefore these numbers cannot produce powers of 10 by multiplication. In such cases we can only approximate the value of the fraction, though this approximation may be made as close as we wish by taking a sufficient number of places after the 0 point. Thus $\frac{1}{3}$=3.3333 is less than .0001; $\frac{1}{3}$=3.33333 is less than .00001, and so on. Analogues of decimal fractions can be made by taking some other number than 10 as the base of our system of notation: if 6 is our base, for instance, we may write $20\frac{7}{24}$ as 32.143, meaning $(3 \times 6) + 2 + (1 \times \frac{1}{6}) + (4 \times \frac{1}{6^2}) + (3 \times \frac{1}{6^3})$.

DECIMAL SYSTEM. See METRIC SYSTEM.

DECIMATION, in war, the selection of the tenth man of a corps by lot for punishment, as in case of a mutiny. It was early practised by the Romans. Sometimes every tenth man was executed; sometimes only one man of each company, the tenth in order, as was the case when the Saxons mutinied against Blücher before the battle of Waterloo.

The practice was followed by Essex at Dublin (1599), by the Austrians at Leipzig (1642), and by the French at Trèves (1675). The term is frequently used in a loose way for the destruction of a great but indefinite proportion of people, as of an army of inhabitants of a country.

DECIUS, GAIUS, gā'yŭs dē'shĭ-ŭs, **Messius Quintus Trajanus**, Roman emperor: b. Bubalia, Panonia; d. 251 A.D. He reigned from 249 A.D. to 251 A.D. He persecuted the Christians, and among them martyred Fabianus, bishop of Rome, Cyprian, bishop of Carthage, and cast Origen into prison. He perished with his army in a bloody battle near Abricium against the Goths, through the treachery of Gallus, who succeeded him as emperor.

DECIUS JUBELLIUS, Roman general. He was appointed to the command of the Campanian legion, which had been stationed at Rhegium for its protection 281 B.C. Under pretext that the inhabitants were intending to betray the garrison to Pyrrhus, he perpetrated the greatest atrocities. Shortly after, having been attacked by a disease in his eyes, he sent to Messana for a physician, who happened to be a native of Rhegium. The physician, to revenge the cruelties inflicted on his countrymen, prescribed an application, enjoining Decius to continue it, however painful it might be, till the physician again returned. The pain became insupportable, and at length Decius found that his sight was destroyed. To complete his punishment, the Romans gave effect to the complaints of the citizens, and he perished by his own hands in a Roman prison.

DECIUS MUS, mŭs, **Publius**, Roman consul. In a war against the Latins 340 B.C., he devoted himself to death for his country, that is, after certain rites, rushed into the midst of the foes to certain death. His example was followed by his son, and, according to some historians, by his grandson. Such acts of self-devotion (*devotiones*) were not unusual at that time, when patriotism and piety exerted a powerful influence.

DE CIVITATE DEI, 'The City of God.' Augustine's characteristic theological system is to be looked for elsewhere in his writings against Pelagius and the Donatists: the depths of his individual religious experiences are revealed with keen powers of self-analysis in 'The Confessions.' The title of the present work suggests that Augustine had in mind the kind of composition of which Plato's 'Republic' is the supreme example. Such a detailed ideal construction of a newly-organized polity was, however, far from the author's mind. For this reason to appeal to 'The City of God' as a preliminary outline of mediæval politics is to misunderstand the point of view from which it was written. Neither Plato nor More nor Campanella nor Harrington, nor the various recent constructions of a new order of society along socialistic lines, can be used to render intelligible the purpose Augustine had in view. There are political and sociological elements in Augustine's work as there are theological and philosophical presuppositions, but there is no systematic development of any of these factors; not because Augustine had an unsystematic mind like Clement of Alexandria, but because he prepared 'The City of God' as a complete armory of Christian apologetic adapted for the questions debated between Christians and Polytheists in the 4th century. Just because the book was written to meet peculiar contemporary conditions, it is full of what appears to the modern reader as extraneous and tedious material. 'The City of God' is primarily an attack on paganism in the form in which paganism was still supported in the age after Christianity had become, under Constantine, the recognized religion of the Roman state. Augustine planned on a large scale an argument in rebuttal against the claim made by the adherents of old-fashioned polytheism that the adoption of Christianity by the Roman Empire had brought about political ruin and ethical demoralization. To make the anti-pagan case complete, copious quotations are made from the historic records of the Roman people to show that they had always been debarred and that their political schemes had failed. Augustine uses extensive literary sources, but as he is dealing with what was to him a practical everyday issue, he often draws examples and illustrations from actual life. He describes the manufacture of silverware, he tells of miraculous cases of healing, relates wonders he has witnessed himself, notes in detail examples of heathen astrology and thaumaturgy, mentions the invasion of the Goths under Alaric and refers to the civil wars due to the dynastic quarrels in the family of Constantine. All this varied material is treated from a special point of view which itself is closely related with the generally misunderstood title of the book. According to Augustine the *summum bonum* is man's supernatural union with God. All rational beings enjoy the privilege of this union either under normal or transcendent conditions. 'The City of God' then is the community of all spiritual beings, angels as well as men, who are within the sphere of divine grace. In sketching such a community of souls, questions of a visible, social organization are altogether unimportant. All the emphasis is laid upon the contrast between the city of earthly beings, whose end is destruction, and the city of God, in which the souls of the elect realize the true laws of their own being. There is nothing in the book which leads one to infer that Augustine looked for a reorganization of society under the influence of the Church as a result of the downfall of the Roman Empire. Incidentally in the course of his argument Augustine introduces judgments on the actual social order as he knew it which are of permanent interest. He touches on æsthetic questions, discusses family and state relationships, examines the foundation of the right of private property and the justification of class distinctions. To this extent 'The City of God' has a permanent place in sociological thought, because it gives expression to the reflections of a keen and original mind on the last stage of ancient civilization.

Among the many translations of 'The City of God' the most satisfactory is that of Marcus Dods in T. and T. Clark's 'Patristic Library.' A reprint of the 17th century revision by John Healey will be found in Dent's 'Temple Classics.' The Latin text appears in a convenient form in Teubner's series of classical texts. The best critical edition is that published in the 'Latin Ecclesiastical Writers' (Vienna Academy Collection). Among modern works the following are especially useful: Carlyle, R. W., and Carlyle, S. J., 'History of Mediæval Political Theory'; Bertrand, L., 'Saint Augustin'; Troeltsch, E., 'Augustin die christliche Antike im Mittelalter'; Mausbach, J., 'Die Ethik des Hl. Augustin'; Schilling, O., 'Die Staats und Soziallehre des Augustins'; Hardy, Georges, 'Le De Civitate'; Angus, S., 'Sources of the First Ten Books of Augustine's City of God'; Eucken, R., 'Die Lebens auschauungen der grossen Denker.'

WILSON LLOYD BEVAN.

DECK. See SHIP.

DECKEN, Karl Klaus von der, German African traveler: b. Kotzen, Brandenburg, 8 Aug. 1833; d. Africa, 25 Sept. 1865. He entered the Hanoverian army, which he left after 10 years' service (1860) to follow his bent toward travel. On Barth's advice he went to Zanzibar and started thence on a journey to Lake Nyassa, which failed through the treachery of his Arab guide. Next year he started on a second and successful journey to the mountain regions of Kilimanjaro. In the following year, with Kersten, he climbed that mountain to the height of 13,780 feet. In 1863 he made an extensive voyage along the east coast of Africa, after which he returned to Europe to plan a great expedition for the exploration of East African rivers. This journey ended in disaster and Decken was murdered by a Somali. A description of his journeys was published by Kersten and other survivors in 'Karl Klaus von der Deckens Reisen in Ostafrika 1859–65' (4 vols., 1869–79).

DECKER, Thomas. See DEKKER, THOMAS.

DECLARATION, (1) a formal or positive explanation of any circumstance. (2) That part of law process or pleadings in which a statement of the plaintiff's complaint against the defendant is set forth, with the additional circumstances of time and place when and where the injury was committed, where these are requisite. (3) A simple affirmation allowed in certain cases to be taken instead of an oath or solemn affirmation. (See AFFIRMATION; OATH). In the United States, the form of an oath is immaterial, provided it be such as the witness believes is binding upon his conscience, but it is essential that the oath, declaration or affirmation be administered in a manner prescribed by law. Mere technical variations do not affect the validity of an oath, and verbal deviations are immaterial. Perjury may be committed although the person was improperly sworn. No person is permitted to make a declaration or affirmation unless he has conscientious scruples against swearing or taking an oath. Declaration in lieu of an oath or affirmation has become general throughout the United States. (4) The statement made by a prisoner, on being arrested on suspicion of a crime, which is taken down in writing.

DECLARATION, Dying, a declaration made by a person near death. The rule that secondary or hearsay evidence is inadmissible suffers an exception, in law, in the case of a declaration made by a person convinced of impending death and who may not survive the trial of the accused. In Scotland, the dying declaration of a witness is admissible even though not conscious of the danger of death, and in the United States a declaration is frequently admitted, both in civil and in criminal cases, as primary evidence, without regard to the immediate apprehensions of death. The principle under which the dying declaration is admitted is that the awful situation of the dying person is as powerful over conscience as the obligation of an oath, and does away with all motive to disguise the truth. Accordingly the person against whom a dying declaration is put in evidence may be allowed to show that the deceased was not of such a character as to feel the religious obligation of the situation. A dying declaration may be adduced for as well as against a person accused of crime; and there are cases on record in which persons charged with murder have been successfully exculpated on this kind of evidence.

DECLARATION OF INDEPENDENCE, UNITED STATES. The steps by which the extra-legal *de facto* governments of the colonies during the early Revolution — the Committees of Correspondence and Safety — were turned into formal legislative bodies, are detailed under CONSTITUTIONS, STATE; and CONGRESS, CONTINENTAL.

The first Congress, of 1774, assumed neither executive nor legislative authority. The second, early in its existence (6 July 1775), formally disclaimed any purpose of separation. The first half-unconscious step was the appointment, November 1775, of five commissioners to maintain communications with friends of the colonies in "Great Britain, Ireland, *or elsewhere*": only independent countries send ministers. Thomas Paine's 'Common Sense,' urging independence as inevitable, and the sooner the better, appeared 9 Jan. 1776; it had wide influence and unlocked many tongues. So general was the concurrence with Paine's views that, in fear of them, three of the middle colonies — New Jersey, Pennsylvania and Maryland — instructed their delegates to vote against any such measure; the other two, New York and Delaware, were bitterly divided and their delegates took no part in forwarding the independent movement; South Carolina was also hostile, contrary to its usual habit of eager initiative — probably from fear of England stirring up the great Indian confederations against the South, as was afterward done. But events pushed them on. British naval captures led Congress, 23 March, to declare all British vessels lawful prize; and on 6 April it opened all United States ports to all vessels other than British. This was an act of absolute sovereignty, acknowledged or not. The colonies, under instructions from Congress, were steadily forming State governments (see CONSTITUTIONS, STATE); and Congress 10 and 15 May recommended all the remaining ones to take the same step, which of course involved making their common Union independent also. John Adams was the foremost agent in all this work. The North Carolina convention 22 April resolved to "concur with those in the other colonies in declaring independence." On 17 May Virginia instructed her delegates in Congress to move a "Declaration of Independence"; and on 7 June Richard Henry Lee made a motion to that effect in Congress, which was seconded by John Adams. On the 8th and 10th this was debated in Committee of the Whole; but action was postponed to 1 July, as some delegations were averse and others were waiting instructions.

On the 10th a committee of five was appointed to draw up the Declaration: Thomas Jefferson of Virginia, John Adams of Massachusetts, Benjamin Franklin of Pennsylvania, Roger Sherman of Connecticut and Robert R. Livingston of New York. Its composition was assigned to Jefferson by the committee; the latter and Congress made many changes, but mostly by omission rather than alteration of wording, so that the language is practically all Jefferson's. The chief cancellations were five; (1) and (2) The last two counts of his indictment of the king. (1) That he had "incited treasonable insurrections of our fellow-citizens" by promising them confiscated property. The charge was probably felt to be too weak to maintain, as well as likely to weaken the general case. (2) That he had carried on the slave-trade, and refused to allow American legislatures to suppress it. South Carolina and Georgia, which were actively carrying it on themselves, would not permit this; and too much Northern wealth had been earned by it not to make the North very willing to suppress the passage, which would impress foreign nations unpleasantly as to their sincerity. (3) Superfluous rhetoric about the incredulity of "future ages" as to the daring tyranny of the king. (4) Review of American history, denying that Great Britain had assisted in our establishment, and alleging that "submission to their parliament was no part of our constitution." It was thought best to go as little into the remote origins as possible, fixing the attention upon recent oppressions and natural rights; and above all, to ignore the existence of Parliament altogether. That body is not alluded to, except inferentially as the "others" with whom the king has "combined" to subject the colonies to an alien and illegal jurisdiction. This was in pursuance of the steady contention of the colonies. (5) Attacks on the English people for re-electing "the disturbers of our harmony," and allowing their chief magistrate to perpetrate these enormities. This was struck out to avoid giving offense to the friends of the colonies in England, who in fact, by upholding Liberal leaders and even generals, saved us at last.

The Declaration was reported 28 June. On

1 July as fixed, debate was begun afresh on Lee's resolution. New Jersey and Maryland had reversed their instructions meantime. In Committee of the Whole that evening, nine States voted for it; Pennsylvania and South Carolina voted against it (but the latter delegates, possibly after hearing from the South, offered without instructions to vote yes if it would make a unanimous vote), Delaware was divided, and New York refused to vote. The "yea" Delaware delegate, McKean, sent an urgent message to the third, Cæsar Rodney, then on a political trip in southern Delaware, to come on at once; Rodney traveled 80 miles the next day, arrived in the evening, and reversed his State's vote. Pennsylvania reversed hers also; and this leaving only the abstaining New York delegates out of the voting, the South Carolina members voted yes. This carried the motion that "these united colonies are and of right ought to be free and independent States, that they are absolved from all allegiance to the British Crown, and that all political connection between them and the state of Great Britain is and ought to be totally dissolved," by 12 yeas and no negative vote. On the 3d the Declaration was taken up, and as amended was passed on the evening of the 4th. The anniversary of the fact of independence is therefore the 2d; that of the adoption of the specific document in which it was proclaimed to the world is the 4th, as celebrated. The usual statement that it was "signed" by the members at this time, however, is incorrect; it was signed by the president and secretary, whose signatures only were borne by the printed copies sent out. The journals of Congress did not enter the Declaration, but left a blank for it, which was afterward filled in and the signatures taken from the engrossed copy. On the 9th the New York convention ratified it, and the delegates gave in their formal adherence on the 15th; it was then, as entitled, "The Unanimous Declaration of the Thirteen United States of America." Six additional Pennsylvania members also recorded a formal vote on the 20th. On 19 July Congress passed a resolution that it should be engrossed on parchment, and on 2 August it was signed by 53 members present; Gerry of Massachusetts, McKean of Delaware and Thornton of New Hampshire were empowered by their legislatures to sign later, Thornton not signing till 4 November. For an analysis of the Declaration and bibliography see UNITED STATES — *The Declaration of Independence.*

The parchment with the original signatures was deposited with the Department of State when the government was organized in 1789. In 1823 John Quincy Adams had a copper-plate facsimile made, to give copies to the signers and their heirs; but unfortunately it ruined the original. The wet sheet pressed on the face drew out the ink so that the signatures have become illegible and almost invisible, and the text partially so; and after being shown for many years only on special occasions, in 1894 it was definitely sealed up in a steel case to keep it from light and air. From 1841 to 1877 it was in the Patent Office.

The signers represented the States as follows:

New Hampshire: Josiah Bartlett, William Whipple, Matthew Thornton.

Massachusetts: John Hancock, Samuel Adams, Robert Treat Paine, Elbridge Gerry.

Rhode Island: Stephen Hopkins, William Ellery.

Connecticut: Roger Sherman, Samuel Huntington, William Williams, Oliver Wolcott.

New York: William Floyd, Philip Livingston, Francis Lewis, Lewis Morris.

New Jersey: Richard Stockton, John Witherspoon, Francis Hopkinson, John Hart, Abraham Clark.

Pennsylvania: Robert Morris, Benjamin Rush, Benjamin Franklin, John Morton, George Clymer, James Smith, George Taylor, James Wilson, George Ross.

Delaware: Cæsar Rodney, George Reed, Thomas McKean.

Maryland: Samuel Chase, William Paca, Thomas Stone, Charles Carroll of Carrollton.

Virginia: George Wythe, Richard Henry Lee, Thomas Jefferson, Benjamin Harrison, Thomas Nelson, Jun., Francis Lightfoot Lee, Carter Braxton.

North Carolina: William Hooper, Joseph Hewes, John Penn.

South Carolina: Edward Rutledge, Thomas Heyward, Jun., Thomas Lynch, Jun., Arthur Middleton.

Georgia: Button Gwinnett, Lyman Hall, George Walton.

It may be noted that several of these were not members of Congress when the Declaration was passed.

The Declaration, as agreed to, follows:

A DECLARATION

BY THE REPRESENTATIVES OF THE UNITED STATES OF AMERICA IN CONGRESS ASSEMBLED

When, in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume, among the powers of the earth, the separate and equal station to which the laws of nature and nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

We hold these truths to be self-evident, that all men are created equal; that they are endowed by their Creator with certain unalienable rights; that among these are life, liberty, and the pursuit of happiness. That to secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed; that, whenever any form of government becomes destructive of these ends, it is the right of the people to alter or to abolish it, and to institute a new government, laying its foundation on such principles, and organizing its powers in such form, as to them shall seem most likely to effect their safety and happiness. Prudence, indeed, will dictate that governments long established should not be changed for light and transient causes; and, accordingly, all experience hath shown, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But, when a long train of abuses and usurpations, pursuing invariably the same object, evinces a design to reduce them under absolute despotism, it is their right, it is their duty, to throw off such government, and to provide new guards for their future security. Such has been the patient sufferance of these colonies, and such is now the necessity which constrains them to alter their former systems of government. The history of the present King of Great Britain is a history of repeated injuries and usurpation, all having, in direct object, the establishment of an absolute tyranny over these States. To prove this, let facts be submitted to a candid world:

He has refused to assent to laws the most wholesome and necessary for the public good.

He has forbidden his governors to pass laws of immediate and pressing importance, unless suspended in their operation till his assent should be obtained; and, when so suspended, he has utterly neglected to attend to them.

He has refused to pass other laws for the accommodation of large districts of people, unless those people would relinquish the right of representation in the legislature; a right inestimable to them, and formidable to tyrants only.

He has called together legislative bodies at places unusual,

From the Painting by Trumbull

SIGNING THE DECLARATION OF INDEPENDENCE

uncomfortable, and distant from the depository of their public records, for the sole purpose of fatiguing them into compliance with his measures.

He has dissolved representative houses repeatedly, for opposing, with manly firmness, his invasions on the rights of the people.

He has refused, for a long time after such dissolutions, to cause others to be elected; whereby the legislative powers, incapable of annihilation, have returned to the people at large for their exercise; the State remaining, in the meantime, exposed to all the dangers of invasion from without, and convulsions within.

He has endeavored to prevent the population of these States; for that purpose, obstructing the laws for naturalization of foreigners; refusing to pass others to encourage their migration hither, and raising the conditions of new appropriations of lands.

He has obstructed the administration of justice, by refusing his assent to laws for establishing judiciary powers.

He has made judges dependent on his will alone, for the tenure of their offices, and the amount and payment of their salaries.

He has erected a multitude of new offices, and sent hither swarms of officers to harass our people, and eat out their substance.

He has kept among us, in times of peace, standing armies without the consent of our legislatures.

He has affected to render the military independent of, and superior to, the civil power.

He has combined, with others, to subject us to a jurisdiction foreign to our constitution, and unacknowledged by our laws; giving his assent to their acts of pretended legislation:

For quartering large bodies of armed troops among us:

For protecting them by a mock trial from punishment, for any murders which they should commit on the inhabitants of these States:

For cutting off our trade with all parts of the world:

For imposing taxes on us without our consent:

For depriving us, in many cases, of the benefit of trial by jury:

For transporting us beyond seas to be tried for pretended offenses:

For abolishing the free system of English laws in a neighboring province, establishing therein an arbitrary government, and enlarging its boundaries, so as to render it at once an example and fit instrument for introducing the same absolute rule into these colonies:

For taking away our charters, abolishing our most valuable laws and altering fundamentally, the powers of our governments:

For suspending our own legislatures, and declaring themselves invested with power to legislate for us in all cases whatsoever.

He has abdicated government here, by declaring us out of his protection, and waging war against us.

He has plundered our seas, ravaged our coasts, burnt our towns, and destroyed the lives of our people.

He is, at this time, transporting large armies of foreign mercenaries to complete the work of death, desolation, and tyranny, already begun, with circumstances of cruelty and perfidy scarcely paralleled in the most barbarous ages, and totally unworthy the head of a civilized nation.

He has constrained our fellow-citizens, taken captive on the high seas, to bear arms against their country, to become the executioners of their friends and brethren, or to fall themselves by their hands.

He has excited domestic insurrections amongst us, and has endeavored to bring on the inhabitants of our frontiers, the merciless Indian savages, whose known rule of warfare is an undistinguished destruction of all ages, sexes, and conditions.

In every stage of these oppressions we have petitioned for redress in the most humble terms; our repeated petitions have been answered only by repeated injury. A prince whose character is thus marked by every act which may define a tyrant, is unfit to be the ruler of a free people.

Nor have we been wanting in attention to our British brethren. We have warned them, from time to time, of attempts made by their legislature to extend an unwarrantable jurisdiction over us. We have reminded them of the circumstances of our emigration and settlement here. We have appealed to their native justice and magnanimity, and we have conjured them, by the ties of our common kindred, to disavow these usurpations, which would inevitably interrupt our connections and correspondence. They, too, have been deaf to the voice of justice and consanguinity. We must, therefore, acquiesce in the necessity which denounces our separation, and hold them, as we hold the rest of mankind, enemies in war — in peace, friends.

We, therefore, the representatives of the United States of America, in General Congress assembled, appealing to the Supreme Judge of the World for the rectitude of our intentions, do, in the name and by the authority of the good people of these colonies solemnly publish and declare, That these United Colonies are, and of right ought to be, Free and Independent States; that they are absolved from all allegiance to the British crown, and that all political connection between them and the State of Great Britain is, and ought to be, totally dissolved; and that as free and independent States, they have full power to levy war, conclude peace, contract alliances, establish commerce and to do all other acts and things which independent States may of right do. And for the support of this declaration, with a firm reliance on the protection of Divine Providence, we mutually pledge to each other our lives, our fortunes, and our sacred honor.

John Hancock
Saml Adams Phil. Livingston
Robt Treat Paine Wm Floyd
John Adams Fran' Lewis
Elbridge Gerry
Josiah Bartlett Richd Stockton
Saml Huntington
Step Hopkins John Hart
Abra Clark Lewis Morris
John Morton
Matthew Thornton John Penn
Roger Sherman
Wm Whipple Jno Witherspoon
William Ellery Wm Hooper
Oliver Wolcott Robt Morris
Benj Franklin Wm Williams
Wm Paca

Fras Hopkinson Thos Stone
Charles Carroll of Carrollton
Th Jefferson Geo Taylor
Edward Rutledge Joseph Hewes
Jas Smith Geo Ross
Geo Clymer Thos M'Kean
Button Gwinnett Geo Read
James Wilson
Thomas Lynch Junr
Samuel Chase George Wythe
Benjamin Rush Lyman Hall
Richard Henry Lee
Arthur Middleton Thos Nelson jr.
Caesar Rodney Carter Braxton
Benja Harrison Geo Walton
Francis Lightfoot Lee
Thos Heyward Junr.

DECLARATION OF INDULGENCE, a name applied to the declaration or proclamation issued by Charles II (15 March 1672), and also to a proclamation of James II (4 April 1687), which were ostensibly acts granting liberty of conscience to all whose rights to their own method of worship had been curtailed by the Conventicle and Five Mile Acts. These royal acts and declarations of Charles and James suspended the enforcement of the penal statutes which had been made against the Roman Catholics and Nonconformists, and removed the test of qualification for the holding of office in the corporations, army and civil service. James II ordered the declaration to be read in the churches 25 April 1688. The primate and six bishops of the Church of England protested against the order, saying that under cover of zeal for toleration, the governing motive was the benefit of Roman Catholicism; that it was aimed against the established church and was unconstitutional. The king declared their act seditious libel against the Crown and sent the offenders to the Tower. Later they were tried and acquitted, 30 June 1688. On the day of their release an invitation was sent to William of Orange to come and save England from the Roman Catholics. The signers of this invitation, who wished the downfall of James II, were the Earls of Danby, Devonshire and Shrewsbury, the bishop of London, Admiral Russell and Henry Sydney. (See TEST ACTS). Consult Howell, 'State Trials'; Burnet, 'History of James II'; Fox, 'Reign of James II.'

DECLARATION OF LONDON. A diplomatic instrument framed at an international conference held in London in 1909 for the purpose of settling and defining certain rules of maritime law in times of war. The famous Declaration of Paris (q.v.) in 1856 enacted, among other provisions, that a neutral flag covered enemy's merchandise except contraband of war, and that neutral merchandise, with the exception of contraband of war, was not liable to capture under an enemy's flag. Although the 1856 declaration was never accepted by the United States and never ratified by Great Britain, both those nations regarded themselves as being bound by it, and those principles were acted upon by all belligerent nations in all wars between 1856 and recent years. By the 14 Hague conventions of 1907 and the Declaration of London two years later further efforts were made to codify maritime laws in war, especially those referring to the capture of enemy property. But ever since 1856, and more especially after 1907 and 1909, there was a steady growth of opposition in Great Britain against these rules governing capture at sea, on the ground that they deprived the British navy of its most effective weapon against an enemy. Under the pressure of public opinion the British government refused to ratify the 1909 declaration, for it had been signed without the knowledge either of the people or the Parliament. The ministry endeavored to carry the measure by the Naval Prize Bill in 1911; the colonial ministers then assembled in London for the Imperial Conference realized the inherent danger of the declaration to the empire in case of war and demurred against its ratification. Sir Edward Grey, however, won them over by stating that the Declaration "might be made better than it is if we could get other powers to agree," but that it had either to be taken as it stood or left altogether. The House of Lords, however, came to the rescue and rejected the bill. Speaking from knowledge gained under actual war conditions, it is now easy to realize that the Declaration of London would, if acted upon, have been more acceptable to a nation like Germany than to a people situated like the British. How it would have impaired British naval power may be gathered from the following examples: It was made easy to break a blockade, for the right of a blockading force to capture a blockade-runner did not cover the whole period of her voyage and was confined to ships of the blockading force; stereotyped lists of contraband and non-contraband were drawn up, instead of the old custom of leaving the question to the discretion of the Prize Court; a ship carrying contraband could only be condemned if the contraband formed more than half its cargo; a belligerent warship could destroy a neutral vessel without taking it to a port for judgment; the transfer of an enemy vessel to a neutral flag was presumed to be valid if effected more than 30 days before the outbreak of war; the question of the test of enemy property was left in high confusion; a neutral vessel, if accompanied by any sort of warship of her own flag, was exempt from search; belligerents in neutral vessels on the high seas were exempt from capture, a provision by which enemy reservists could return from foreign lands and rejoin their army; and the captain of a German raider could justify his sinking of British ships instead of taking them to a port for adjudication. Directly after outbreak of the war a British Order in Council announced on behalf of the Allies that the principles of the Declaration of London, though not binding upon them, would be adhered to. Successive Orders in Council, instigated by sheer necessity, altered the Declaration beyond recognition. Owing mainly to the existence of the British navy, the German mercantile marine of 3,000,000 or more net tons disappeared from the seas. The provisions of the Declaration of London, however, left Germany free to use the shipping of her neutral neighbors, Norway, with a tonnage of 1,718,000; Sweden with 805,000; Holland with 617,000; Denmark with 548,000, a total of 3,688,000 tons. Finally, an Order in Council, dated 7 July 1916, announced the withdrawal of Great Britain and her allies from the Declaration of London. The note stated that "these rules, while not in all respects improving the safeguards afforded to neutrals, do not provide belligerents with the most effective means of exercising their admitted rights," and "that they could not stand the strain imposed by the test of rapidly changing conditions and tendencies which could not have been foreseen." Consult Cohen, A., 'The Declaration of London' (London 1911).

DECLARATION OF PARIS. A formal statement of rules as to the procedure of belligerent ships in time of war, proposed by the representative of France, and recommended by the plenipotentiaries of the several nations who drew up the Treaty of Paris in 1856. These rules were adopted by France, Great Britain, Austria, Prussia, Russia, Turkey and Sardinia. The United States declined to adopt the Declaration on the ground that they had no navy, and in case of war would have to depend upon arming merchant vessels as privateers. Other nations declining to agree were Spain, Mexico and Venezuela. The code as adopted was as follows:

(1) Privateering is and remains abolished.

(2) The neutral flag covers enemy's goods with the exception of contraband of war.

(3) Neutral goods, with the exception of contraband of war, are not liable to capture under the enemy flag.

(4) Blockades to be binding must be effective, that is to say, maintained by a force sufficient to prevent access to the coast of the enemy.

DECLARATION OF RIGHTS. The Stamp Act Congress (see CONGRESS, CONTINENTAL) of 1765 published a "Declaration of Rights and Grievances of the Colonists of America," protesting against the Stamp Act, and any other effort to tax the colonists while denying them representation in the Parliament which imposed the taxes. They sent a petition to the king, and another to Parliament, claiming the same rights as were enjoyed by Englishmen born within the British Isles. The right of representation was included in these; but instead of petitioning for that right, they declared its obvious impossibility a reason why they should not be subject to taxation. The Continental Congress of 1774 (see CONGRESS, CONTINENTAL) asserted a similar claim in its declaration, as a preliminary to calling a final congress, and the Declaration of Independence begins with a like assertion. The assertion of such claims was considered so vital in written constitutions by men of that age that the strongest objection to our national one was its omission in this particular, and the storm of amendments pushed forward (see CONSTITUTIONAL AMENDMENTS) consisted mainly of bills of rights. For a statement of the Bill of Rights of the English nation prepared for the convention that called William and Mary to the throne, see BILL, *Bill of Rights.*

DECLARATION OF WAR. A public proclamation in which one government declares itself to be at war with another. In the United States, Congress alone has the power to declare war, and when that body votes for war with a foreign power, such a measure is considered tantamount to a declaration of war. Prior to the ratification of The Hague Convention (q.v.) which provided for procedure in regard to the opening of hostilities, the doctrine that notice must be given an enemy before commencing hostilities had not been regarded as an obligation, and practice respecting it had shown no uniformity. Owing to the world-wide use of the telegraph, submarine cable and wireless telegraphy and the wide diffusion of news by which every incident in the events leading to war are instantly published, a formal declaration was scarcely deemed necessary or required by morality or international law, and each belligerent was usually satisfied with announcing its warlike intentions to its own subjects and to neutrals. On the outbreak of war belligerents have usually followed the custom of issuing a manifesto describing the events leading to the necessity for such a declaration and justifying their attitude, but such a document is not obligatory, though oftentimes useful. The Hague Convention, to which the United States subscribed, provides as follows:

ARTICLE I.—The contracting powers recognize that hostilities between themselves must not commence without previous and explicit warning, in the form either of a reasoned declaration of war or of an ultimatum with conditional declaration of war.

ARTICLE II.—The existence of a state of war must be notified to the neutral powers without delay, and shall not take effect in regard to them until after the receipt of a notification, which may, however, be given by telegraph. Neutral powers, nevertheless, cannot rely on the absence of notification, if it is clearly established that they were in fact aware of the existence of a state of war.

The first step after an endeavor to adjust the difficulties by diplomacy is an ultimatum, the non-compliance with which on or before the time limit set usually means the outbreak of hostilities, though often no absolute time limit is set. This happened in President Wilson's demand on 25 June 1916 that Carranza, constitutionalist President of Mexico, immediately release the American troopers captured in the encounter at Carrizal and make an early declaration as to his intentions regarding the American punitive expedition then in Mexico. Several days elapsed before Carranza replied and even then failed to answer fully, but this was overlooked since he evinced a desire to adjust the dispute diplomatically, thus removing the immediate pressing necessity for commencing hostilities. For legal purposes the date of the official opening of a war is usually stated in the declaration. In April 1898 the United States sent an ultimatum to Spain demanding her instant withdrawal from Cuba on pain of war. On her refusal, Congress, 25 April 1898, declared that a state of war between the two countries had existed since 21 April. The same condition obtained in the Russo-Japanese War, the Japanese Minister on 13 Jan. 1904 having presented a note to the Russian government requesting a prompt reply, implying that if there were an unreasonable delay, hostilities would be commenced by Japan. On 5 February telegraphic instructions were issued to the Japanese Minister to announce to the Russian government that Japan had terminated negotiations relative to the proposed Russian convention, which communication was made the following day. On the 8th hostilities began at Port Arthur but the formal declarations of war were not issued until 10 February. When no direct notice is given war is held to date from the time when either party commits the first hostile act. In 1854, before the British Ambassador had withdrawn, a British fleet steamed into the Black Sea to compel the retirement of the Russian fleet to Sebastopol. On the other hand in 1870 Bismarck received a formal notice from the French chargé, and in 1877 Russia sent a formal dispatch to Turkey. For the various declarations on the outbreak of the European War in 1914 see WAR, EUROPEAN. Consult Wilson, George G., 'International Law' (New York 1910).

DECLARATORY ACT, an act passed by the English Parliament, 7 March 1766, accompanying the repeal of the Stamp Act, asserting the constitutional right of the king, with the advice of Parliament, to bind the colonies by its laws and action "in all cases whatsoever." This is English colonial law still; but no attempt is made to enforce it against the wishes of the colonies, except where the rights of British subjects are infringed.

DECLE, dākl, **Lionel,** English explorer and author: b. Rocourt, Saint Quentin, France, 16 May 1859; d. 1 March 1907. He was of French parentage but a naturalized Englishman. He traveled extensively in Asia, Africa and America, was on the staff of the *Pall Mall Gazette* for several years and commanded the *Daily Telegraph* expedition from the Cape to Cairo (1899–1900). He published ‹Three Years in Savage Africa›; ‹Trooper 3809,› an account of his personal experience in the French army; ‹The New Russia› (1906).

DECLENSION, the change of termination in certain classes of words, in various languages, to indicate the relation in which those words stand toward other words in a sentence. The condition of change to which the words are brought by the several terminations are styled cases (Lat. *casus*) or fallings, for some reason imperfectly understood. The words subject to declension are of the classes, noun, adjective, pronoun, article. In the Latin language grammarians generally recognize five declensions, five different modes of forming cases, and to each declinable word they assign six cases, namely, the nominative, genitive (or possessive), dative, accusative (or objective), vocative (or interjectional), and ablative. There is also a locative case, used in the names of cities, and in such forms as *humi, domi.* In the plural the nominative and vocative are always of the same form; so, too, are the dative and ablative. The Greek declensions are variously classified, but most generally made three in number and the cases five, as well as two locative cases found in the dialects. The ancient Sanskrit language has eight cases of nouns and the present language of the Finns has 15; but the languages of western Europe derived from Latin — Italian, Spanish, Portuguese, French, etc.—have dropped the declinational terminations of the Latin, and hence the Latin for «man,» which is declined *homo, hominis, homini, hominem, homo, homine,* has in those modern languages the one form *homme* in French, *uomo* in Italian, *hombre* in Spanish. The ancient Germanic language, from which English is descended, had declensions; but in our language the only remnants of the ancient forms are, the possessive cases of nouns and the objective case of pronouns, I, me; he, him; she, her; they, them. While in the Indo-European languages above cited, as well as in the Semitic tongues, the unity of the word is not destroyed by inflection, in languages like the Turkish, which are styled agglutinative, elements are added in declension which supersede or obscure the individuality of the original word. See CASE; INFLECTION.

DECLINATION, in astronomy, the distance of a heavenly body from the celestial equator (equinoctial), measured on a great circle passing through the pole and also through the body. It is said to be north or south according as the body is north or south of the equator. Great circles passing through the poles, and cutting the equator at right angles, are called circles of declination. Twenty-four circles of declination, dividing the equator into 24 arcs of 15 degrees each, are called hour circles or horary circles.

DECLINATION, Magnetic. See MAGNETISM — TERRESTRIAL.

DECLINATION NEEDLE, or DECLINOMETER. The magnetic meridian passing through any place on the earth's surface is a vertical plane whose direction is that in which a magnetic needle, free to move about a vertical axis, comes to rest under the influence of the earth's magnetic force. In general, the magnetic and geographical (or astronomical) meridians are not coincident; the angle between is termed the magnetic declination, or (in nautical phraseology) the variation. It is east or west, according as the magnetic is east or west of the geographical meridian. Any apparatus for the measurement of this angle is termed a declinometer, and consists essentially of a means of ascertaining the two necessary elements — namely, the directions, at the place of observation, of the two meridians. Permanently fixed instruments of this nature are set up in all magnetic observatories. They are generally self-registering, and record the slightest hourly, diurnal and annual variations in the declination of the magnetic needle, as well as the more violent changes due to magnetic storms. See MAGNETISM.

DECLINE AND FALL OF THE ROMAN EMPIRE, The, a monumental work by Edward Gibbon, the first volume of which appeared in 1776, and the last in 1788. ‹The Decline and Fall› has been pronounced by many the greatest achievement of human thought and erudition in the department of history. It is a history of the civilized world for 13 centuries, during which paganism was breaking down, and Christianity was superseding it; and so bridges over the chasm between the Old World and the New. It is marked by dignity of style and picturesqueness of narration. The great criticism of the work has always been upon the point of Gibbon's estimate of the nature and influence of Christianity.

DECOCTION, in pharmacy, a solution of a vegetable principle largely obtained by boiling in water the substance containing the principle. Inasmuch as plant drugs usually yield their constituents more readily to hot water than they do to cold water, decoctions are preferred to infusions for obtaining the active principles of plants. Decoctions are not very much used at the present time, because of their great complexity, the active principles of plants being obtained by other means.

DECOIC ACID, or **CAPRIC ACID,** an organic acid having the formula $C_{10}H_{20}O_2$, and occurring in the form of various compounds in butter, cocoanut oil, fusel oil (from certain sources), Limburg cheese and the fatty matters extracted from the wool of sheep. It is soluble in alcohol and ether, but almost insoluble in cold water. It crystallizes in needles that have a faint odor suggestive of rancid butter, and is prepared by the distillation of oleic acid, or by the oxidation of that acid by nitric acid. The name «capric» has reference to the fancied resemblance of the odor to that of a goat; while «decoic» refers to the 10-carbon atoms that the acid contains.

DECOMPOSITION, Chemical, is the separation of the constituents of a body from one another, these constituents being obtained either free or in a new state of combination. Limestone, for example, is decomposed into lime and carbonic acid, oxide of mercury into mercury and oxygen, by heat. This is called simple decomposition. Definite organic bodies resemble inorganic in being influenced by similar forces, but the result in their case is somewhat different, arising from their different composition. In the case of an organic body it is possible to convert its constituents at once into their simplest states of combination, but it is also possible to obtain a large number of intermediate compounds by regulating the decomposing action. The process by which such bodies are thus decomposed is styled by chemists compound decomposition. A double decomposition is a reaction in which the elements of two substances rearrange themselves to form two new substances, each of which contains elements from each of the old substances. Thus salt and sulphuric acid react to give hydrochloric acid and sodium sulphate. See REACTION.

DECORAH, Iowa, city and county-seat of Winneshiek County, situated near the northeastern corner of the State on the upper Iowa River, about 30 miles from its mouth, and on the Chicago, Milwaukee and Saint Paul and the Chicago, Rock Island and Pacific railroads. It is a centre of farming, milling and stockraising industries, and has manufactures of wagons, metal boats, valves, patent medicines, etc: Luther College, Valder College and a hospital are the chief institutions. Decorah was settled in 1849; was incorporated as a town in 1857 and was chartered as a city in 1871. Its government is administered under a general law by a mayor elected biennially and a city council. Pop. 3,592.

DECORATED STYLE, the second style of pointed (Gothic) architecture, in use in Great Britain from the end of the 13th to the beginning of the 15th century, when it passed into the Perpendicular. It is distinguished from the Early English, from which it was developed, by the more flowing or wavy lines of its tracery, especially of its windows, by the more graceful combinations of its foliage, by the greater richness of the decorations of the capitals of its columns, and of the moldings of its doorways and niches, finials, etc., and generally by a style of ornamentation more profuse and naturalistic, though perhaps somewhat florid. The most distinctive ornament of the style is the ball-flower, which is usually inserted in a hollow molding. The Decorated style has been divided into two periods, namely, Early or Geometrical Decorated period, in which geometrical figures are largely introduced in the ornamentation; and the Curvilinear, in which the peculiar characteristics of the style are exhibited. To this latter period belong some of the finest monuments of British architecture. See ARCHITECTURE.

DECORATION, Interior. See INTERIOR DECORATION.

DECORATION DAY, a holiday observed in many States as an occasion for decorating the graves of soldiers killed in the Civil War, whether in national or private cemeteries. The custom of a "Memorial Day" (as it is otherwise called) originated with the Southern States, and was copied scatteringly and on different days in some Northern States,— all in the spring, for natural reasons. On 5 May 1868 Gen. John A. Logan, then commander-in-chief of the Grand Army of the Republic, issued an order appointing 30 May of that year for Grand Army services in so decorating graves — choosing that day possibly as being the date of discharge of the last Union volunteer of the War. The States which observe the day have adopted it singly, there being no national law on the subject. It is a legal holiday in all States including Porto Rico, Hawaii, Alaska and the District of Columbia, with the exception of Arkansas, Florida, Louisiana, Mississippi, North Carolina, South Carolina and Texas. In Virginia it is called Confederate Memorial Day.

DECORATIONS. See ORDERS AND DECORATIONS.

DECORATIVE ART. The generic name for all the arts which have for their purpose the embellishment or beautifying of buildings or other objects. Since the decorative arts, as such, make their appeal to the æsthetic sense in serving primarily the end of beauty rather than of utility, even though applied to objects of use, they are properly classed among the fine arts. (See FINE ARTS). Yet inasmuch as their operations do not produce independent creations but are applied to, or executed upon, buildings and objects of utility, the decorative arts form a class by themselves, midway between the useful arts and the independent or "pure" fine arts, whose works are produced for their own sake, or rather for the sake of the æsthetic enjoyment which they in themselves afford — such as painting, sculpture, architecture or music. The higher forms of decorative art do, however, approach closely to the rank of independent art. Since architectural decoration employs both painting and sculpture for the embellishment of buildings, the sculptor or mural painter may produce for this purpose works of such beauty in themselves, apart from their function of decorating the building, as to rank with the finest works of independent sculpture or painting. The pediment sculptures of the Parthenon are superb as statues, though deposed from the pediments for which they were designed. The world's museums are full of paintings originally designed as decorations of altars, ceilings or even furniture, but which, separated from their original settings, are admired as paintings, that is, as pure fine art. No absolute line can therefore be drawn between decorative art on the one hand, and pure fine art on the other. Architecture, which ranks as one of the major fine arts, is itself the greatest of the decorative arts, its function being to make beautiful the utilitarian structures it designs for the shelter of man and of his varied activities. But by reason of its superior importance and its recognized place among the major fine arts, as well as its employment of many of the decorative arts in subordination to itself, it is rarely ranked with the latter.

Classification.— The decorative arts are divided into two main classes: those which serve architecture, that is, which are employed for the adornment of buildings or fixed structures; and those which are applied to movable objects. The first are the major decorative arts, or the arts allied to architecture; the second are commonly called the industrial decorative arts, or the minor arts. The major decorative arts include mural painting, architectural sculpture and carving, mosaic, inlay, stained glass and architectural woodwork, metalwork and plasterwork. The industrial decorative arts include furniture, textile art (tapestries, rugs, carpets, embroidery, needlework, laces, brocades and printed fabrics), wall-papers, decorative ceramics and pottery, jewelry, goldsmith's and silversmith's work, bookbinding, typographical ornament, manuscript illumination and many other arts and industries. Some of the minor arts in their highest phases approach the pure fine arts, as in the case of cameos, medals and jewelry; others trench upon the domain of architectural decoration, as in the more monumental forms of church furniture. Here, again, absolute lines of demarcation cannot always be drawn.

For the discussion of sculpture applied to decoration see the article SCULPTURE; for that of decorative painting see INTERIOR DECORATION; MURAL PAINTING and PAINTING. See also DECORATIVE ARTS, MINOR, of which a number are treated under separate titles, e.g., BOOKBINDING, EMBROIDERY, FURNITURE, JEWELRY, LACE, POTTERY, TAPESTRY, etc.

Methods and Technic.— A volume would be required even to summarize the immense amount and variety of the processes and manipulations of the decorative arts, and the books and manuals treating of them would fill a large library. In a brief article it is only possible to notice a few of the more general considerations involved. Decoration is effected by modifications of the form and surface of an object, or by the use of color, or by both combined. All the arts which manipulate form alone are called the *plastic* arts; these include all kinds of modeling, carving, embossing, forging, casting and all relief and incised work. The arts of decoration by color are the *chromatic* arts, such as painting, mosaic, inlay, stained glass, enamel, all textile work in color, damascening and niello-work in or on metal, and manuscript illumination. There are also many arts which combine plastic and chromatic manipulations.

On the side of design, the decorative arts make use of *pictorial representation*, not only in mural painting and decorative sculpture, but also in the minor arts, as in painted vases, mosaics and stained glass. Both the human figure and the forms of animals are prolific elements in the decorative arts of almost all ages and peoples, with the exception of the majority of the Mohammedan arts, which exclude all realistic portrayals of living beings, even of plants. Flowers and foliage are conspicuous in certain styles of decorative art (see PLANTS, ORNAMENTAL), but these are usually conventionalized, not represented in a purely realistic way. The original purpose of decorative representations of living form has usually been symbolic or allegorical, or even, in the more primitive arts, animistic. But as each art has developed, such forms have come to be used more and more for their purely decorative value, their original symbolic significance being gradually lost. Along with these, all styles of decoration have developed other forms, purely ornamental, as motives which they have combined into patterns (conventional ornament), having little or no symbolic significance, but serving purely as embellishments, enriching the object by a pleasing play and variation of line, light-and-shade and color, through the rhythmic repetitions, alternations, variations and contrasts of the pattern. The Mohammedan races, deprived of the resource of naturalistic representation, have developed the art of surface patterning with purely geometric motives to an extraordinary degree of variety and splendor. See MOHAMMEDAN ART.

History.— Decoration is the earliest form of expression of man's æsthetic instinct. The fine arts had their birth in primitive efforts to embellish the person or to beautify objects of personal or ceremonial use. (See ABORIGINAL ART). With the advance of civilization, to the primitive arts of weaving, pottery and wood carving was added architecture, in the effort to adorn the cave, hut or kraal of the tribe or of its fetish or gods. Later the art of smelting metals enabled men to make tools of copper or bronze, later of iron and steel, superior to the primitive flint knives and axes. Decorative metal-work, jewelry and architectural sculpture and carving now began to advance to higher achievements than had been dreamed of before, and painting was applied to walls and ceilings with great effect. These developments took place first, some thousands of years B.C., in the Nile Valley, while in the valley of the Tigris-Euphrates a parallel development was going on, with brick and tile as the chief building materials, in place of stone. In both regions textile art was carried to a very high pitch of decorative beauty, and gold, silver, bronze and glass as well as pottery were employed for dishes and vases of great elegance of form and richness of decoration.

These various arts were disseminated through the Mediterranean basin by Phœnician commerce, and contributed to the formation of Greek decorative art, which, developing after the middle of the 7th century B.C., excelled in two fields especially — architectural carving and sculpture, and pottery; although, indeed, the Greeks "touched nothing that they did not adorn." The Roman civilization, developing later and borrowing freely from the Greek, carried the art of architectural carving to even higher perfection, at least in variety and splendor, especially during the Imperial Age, from 27 B.C. to 313 A.D. The Romans made the first systematic applications of mosaic to architectural decoration. This art was taken up by the Byzantines in the 5th century A.D. and employed by them in wall and vault decorations of unsurpassed splendor, for at least eight centuries, in Italy as well as in their own empire. They also excelled in ecclesiastical goldsmith's work, in enameling on metal, in needlework and in manuscript illumination. See BYZANTINE ART.

The Middle Ages witnessed the growth of two distinct systems of decorative art: that of the Christian world in Europe generally, which culminated in the superb triumphs of Gothic architecture, carving, stained glass and manuscript illumination, besides enamel and metalwork in France and inlay and mosaic in Italy: and that of the Mohammedan peoples in western Asia, northern Africa, Spain and India. This Oriental art was especially rich in surface decoration (as in the stucco wall-paneling of the Moors), and in various forms of textile art — carpets, rugs and needlework. To this day the great peoples of Asia, the Chinese, Japanese and Hindus, as well as the Mohammedans of Persia, Turkey and parts of Arabia, are consummate masters of the minor arts. The decorative arts of the non-Moslems of

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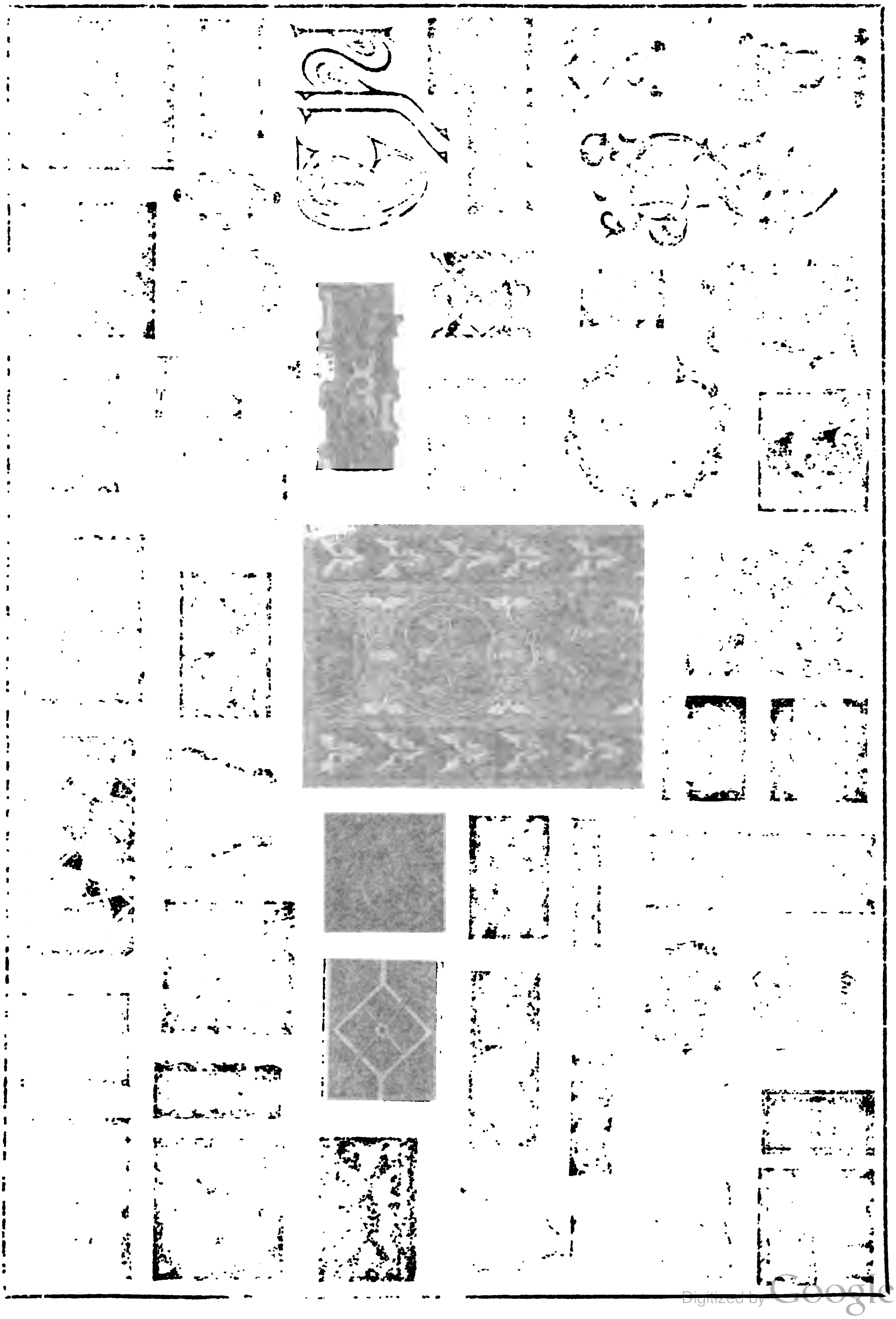

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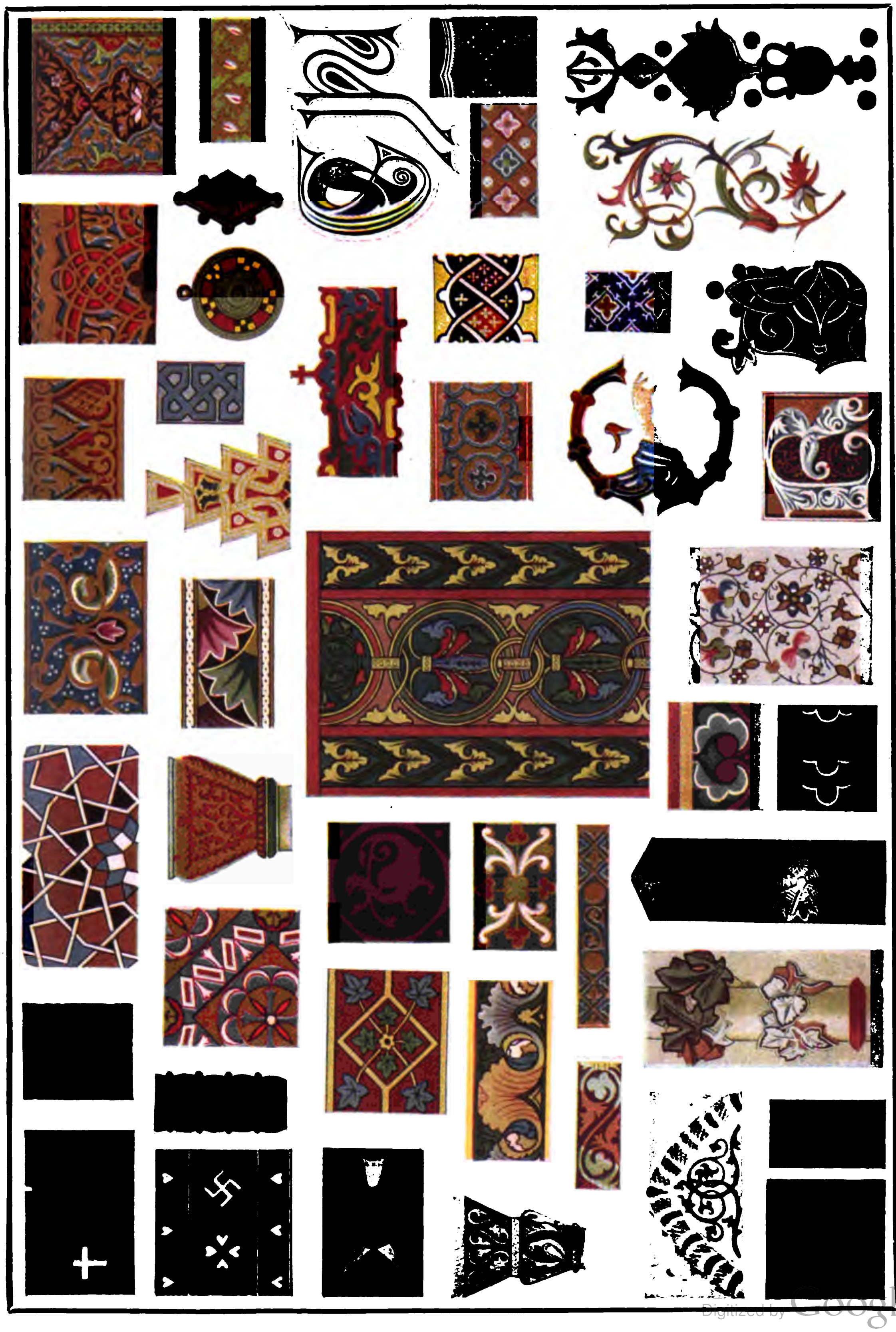
History. — Decoration is the earliest [illegible] expression of the artistic instinct [illegible] shown first in the primitive [illegible] to adorn the person or to beautify [illegible] by [illegible] personal or ceremonial use. (See [illegible] ART.) With the advance of civilization [illegible] primitive arts of weaving, pottery and [illegible] were perfected and [illegible] in [illegible] to add to the [illegible] of the [illegible]. Later the art of [illegible] metals enabled men to make tools of [illegible] bronze, later of iron and steel, superior to the primitive flint knives and axes. [illegible] metalwork, jewelry and [illegible] and carving now began to [illegible] achievements [illegible] and painting was applied to walls and [illegible] with great effect. [illegible] some thousands of years [illegible] Nile Valley, [illegible] of the [illegible] Egyptians a [illegible] development [illegible] In both regions the art [illegible] decorative [illegible] gold and silver, bronze [illegible] as well as pottery were employed [illegible] vases of great elegance of form [illegible] decoration.

[illegible] arts were disseminated [illegible] Mediterranean [illegible] by Phoenician merchants [illegible] forms [illegible] Greeks [illegible] which [illegible] developed [illegible] excelled [illegible] decorative [illegible] sculpture and pottery, although, in [illegible] Greeks [illegible] they did [illegible]. The Roman civilization developed [illegible] architectural carving to [illegible] at least in variety and splendor, especially during the Imperial Age (27 B.C. to 3[illegible] A.D.). The Romans [illegible] systematic application of mosaic to [illegible]. This art [illegible] taken [illegible] Byzantines in the [illegible] century A.D. and employed [illegible] wall decorations of [illegible] eight centuries [illegible] Italy as well as in their own empire [illegible] also excelled in [illegible] goldsmith's [illegible] in [illegible] metal, [illegible] needlework [illegible] manuscript illumination. See BYZANTINE [illegible]

The Middle Ages witnessed the growth of two distinct systems of decorative art [illegible] the Christian world in Europe, generally [illegible] culminated in the [illegible] triumphs of architecture, carving, stained glass and manuscript illumination [illegible] enamel [illegible] work in bronze and [illegible] and [illegible] and that of the Mohammedan peoples of [illegible] Asia, northern Africa, Spain and [illegible]. This Oriental art was especially rich in [illegible] decoration (as in the stucco wall-pat[illegible] the Moors) and in various forms of [illegible] art — carpets, rugs and needlework. [illegible] the great peoples of Asia, the Japanese and Chinese, as well as the [illegible] of Persia, Turkey and parts [illegible] are consummate masters of the [illegible]. The decorative arts of the non-Mo[illegible]

ORNAMENTS



Arabic, Byzantine, and European Designs of the 15th and 16th Centuries.

India and of the Chinese and Japanese form a group by themselves apart from the European developments, which they surpass in variety and richness of minute patterning, and in harmonies of brilliant colors, if not in intellectual quality.

The Renaissance, from 1400 on, revived many of the antique Roman forms, but developed them on new lines. While stained glass passed out of general use, mural painting, from as far back as 1300 under Giotto (q.v.), took its place in Italy and spread thence into all countries. (See Painting). All the arts of wood, stone, metal and textiles were marvelously expanded, enriched and developed. Italy took the lead in all these arts except that of decorative sculpture, in which France has led ever since the early Middle Ages.

The first half of the 19th century was in Europe a period of artistic stagnation. Since then the decorative arts have been revived in all branches, but the development of machine production has greatly modified this development, generally for the worse. Hand-craftsmanship has greatly declined; in certain industries it has wholly disappeared. On the other hand, the multiplying of factory products has made possible a wider distribution of artistic manufactures than when only handwork prevailed. One effort, then, of modern artists is to perfect the design of machine-made products. But another, quite as important, is represented by the «Arts and Crafts» movements of our time, which seek to revive forgotten and neglected handicrafts, to increase the number of individual craftsmen and craftswomen, and to stimulate the public appreciation of the individuality, the personal quality, of hand-wrought objects of decorative art — textiles, pottery, china, metal-work, bookbindings, jewelry — as well as of the major arts of mural painting and decorative carving and sculpture. See Morris, William.

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DECORATIVE ARTS, Minor. Called in former days, frequently, «minor arts.» As the term implies, the decorative arts are those which are called into play in giving an ornamental appearance to articles of utility. In the practice of the decorative arts the essential feature always to be borne in mind is that the decoration is subsidiary to utility. The article itself must not, in its decoration, become less fitted for its purpose, else the article becomes an *ornament.* The basic form of the article decorated must not be modified sufficiently as to hide its purpose. The decorative arts have the function of beautifying; they hide the nakedness of a plain surface, or break the cold regularity of a plain outline. But such embellishments are not brought about by covering (*overloading*) the available space, crowding of ornamentation being a vulgarity not art. If we take, as an illustration, the structure of a chair, the appearance of cumbersomeness may be eliminated for artistic effect by reducing the woodwork to smaller proportions, or rounding off the square edges, thereby creating a decorative effect of lightness. Or the back and legs of a chair may be given decorative curves to avoid angularity. But the tapering or reduced proportions must be so calculated as in no wise to encroach on the necessary strength of the joints or other parts of the structure where the lateral or vertical strain is imposed. In jewelry, as another example, a brooch that is to be worn on delicate or flimsy textiles must have no sharp projecting points which will tear or tangle the textile. Another canon in the teachings of the arts of decoration is that of the adaptability of the decorative treatment to the medium operated on. Thus, with the passing of the «Gothic» period in the tapestry weaves, wonderful imitations of «painting» effects were aimed at by the use of thousands of color tones of yarn. The *painted picture* was *simulated,* but the lovely *woven* effect of tapestry was sacrificed, much to the detriment of the decorative art value. The greatest masters in the decorative arts were, incomparably, the ancient Greeks. Their utensils had marvelous beauty of form, but the form was ever controlled to bring out perfection of the practical usefulness of the object for the purpose desired. The surface decoration never was allowed to interfere with its usage; and the decorative «values» were always subjected to the size and shape of the spaces embellished. The asymmetric disposition of their ornament alike with that of the Japanese *kakiemon* style (see Japanese Ceramics) are admirable expositions of decorative art treatment in perfection. Some of the spheres in which the decorative arts find application are ceramics, enamels, lacquers, arms and armor, woodwork, embroidery, bronzes, engravings, textiles, ironwork, jade and other stone carving, furniture, bookbinding, glass, silversmithing, goldsmithing, rugs, ivories, clocks, locksmithing, mosaics, manuscripts, laces, numismatics, etc. When the Italian Renaissance (16th century) brought its influence to bear on furniture and household utensils the vogue became so forceful that the existing pieces of decorative art work were not only discarded but largely destroyed. With the more grandiose ideas of the French under Louis XIV much of the refined furnishings of royalty and nobility was destroyed or set aside to decay. When the great changes in style of the Regency and Louis XV came about we get the same discarding and destruction of the former art pieces. But soon the Revolution arrived with destructive tendencies entirely void of reconstruction. And the danger of entire loss of the art examples of the past became apparent to a few connoisseurs. David, in supreme power in all art matters early in the 19th century, had no respect for anything but misrepresentations of the antique then being produced and offered no protection for true art works. These connoisseurs, in order to aid the survival of some of the beautiful work of the past, began collecting the remnants of the styles, examples of which were rapidly disappearing. Of such were Alexandre Lenoir, Vivant-Denon (Director of Museums under the Empire); Charles Sauvageot and du Sommerard, who made great collections for the propaganda; Villemin, about 1806, began publishing the great work 'Monuments français inédits,' recalling by illustrations the art beauties of other styles. Revoil assisted in the work. Other art publications helped to place the «pseudo-classic» style of the Empire back in its inferior rank. The hunt for examples of the past art styles became quite popular and such pieces were disclosed in sacristies, garrets, or put to most vulgar uses by the lower classes, given to children to play with, etc. The work of the amateur collector of «period» furniture and «bric-à-brac» became popular with the wealthy in the days of the «Restauration.» Noted among these were such connoisseurs as Carrand, de Pourtalès, de Monville, d'Ivry, Brunet-Denon, Durand, Fiérard, Debruge, Dumenil, Renesse-Breidbach, etc. In 1832 Du Sommerard's great collection was taken to the old Cluny Hôtel (Paris) to become the decorative arts museum visited by the world's artisans for study. The French government, in 1843, purchased the collection and the old Cluny building. The antique treasures of royalty were always dispersed through the different palaces, but after the Revolution of 1848 these different collections were taken over by the state and the Louvre Museum became a rendezvous for art lovers with its old Gallery of Apollo restored and others added and filled with art examples of the Middle Ages and Renaissance. France became the supreme decorative arts producer of Europe when the École Nationale des Arts Décoratifs (founded 1765) was advanced as the centre of art culture for artisans.

The Electors of Saxony from 1553 to 1733 collected large quantities of art works in their Dresden palace, and by 1724 there were separate salons for statuary, ivories, wood-carving, stone and metal-work, gold and silver smithing. The term Grüne Gewölbe (Green Vaults) was applied to the collection. Dresden also acquired, in the 19th century, its Historisches Museum for arms and armor. Ludwig I of Bavaria near the middle of the 19th century brought into being great collections of ivories, wood-carving, Limoges enamels, etc., in his palace at Munich. Friedrich Wilhelm III of Prussia gathered together his art collections and placed them in his Berlin palace which received the title «Königliche Kunstkammer» (Royal Chamber of Art). Its immense popularity and usefulness and its rapid growth caused it to be removed to the «Berlin Museum.» Vienna got together its fine armor collection from the Ambras castle and its great quantities of art and industrial art treasure in the Imperial Palace. Darmstadt, Hanover, Nuremberg, got their museums. In Italy the Uffici Palace Museum of Florence contained many decorative art collections, such as the «Cabinet of Gems»; also the Pitti Palace of Florence became a museum for great gold, silver and bronze art work besides jewelry and faience collections. Rome had long since her galleries of antiques and art collections. England remained oblivious to the fact of the growing decorative arts movement until the Universal Exhibition held in London in 1851, when she opened her eyes to the poverty of her art product from the lack of collections to afford examples as models. Many purchases were made for the British Museum (Arundel Collection, Bernay Collection, etc.). At Burlington House a new museum of decorative arts was accumulated. South Kensington Museum was built and filled with art treasures for use of students of the arts. In 1857 the South Kensington Department of Science and Art was started with branches elsewhere for art instruction. In the Paris Exposition of 1867 was shown the great advance in France in its potteries, its glass work, also in the furniture industry. Vienna then (1864) started her Museum for Art and Industry with fine examples of the arts and crafts. South Kensington Museum (1872) opened its Bethnal Green Museum branch in the midst of the factory district. Berlin in 1867 started its Kunstgewerbe Museum (Museum of Arts and Crafts) after the Vienna model to soon become one of the richest collections in the world. Its instruction schools quickly grew to large proportions in the provincial towns, elevating the chief industries. The Vienna Universal Exposition of 1873 developed into her «Fachschulen» (schools for special branches of study), now so numerous. In Bavaria the Munich National Museum (founded 1867) became powerful in its art work; the ancient treasures of Nuremberg assisted her to greatly increased industrial activity, and it later received its Gewerbe Museum with its permanent exhibition for manufacturers and merchants. Its arts and crafts schools became specialized with separate establishments such as for metal-founding, bookbinding, locksmithing, etc. Now started Kunstgewerbe museums at Hamburg, Leipzig, Dresden, Kaiserslauten, Frankfort, Stuttgart, to be followed later by those of Düsseldorf, Königsberg, Danzig, Karlsruhe, Cologne, Kiel, Krefeld, Halle, Hanover, Flensburg, etc. Crafts expositions helped the industrial art progress, such as those at Munich (1876), Berlin (1872), Dresden (1875), Cologne (1876), Lübeck (1879), Düsseldorf (1880), Nuremberg (1885), Augsburg (1886), Strassburg (1895), Düsseldorf (1901). The great progressive outcome of all these activities became apparent in the Paris Exposition (1900) and the Turin Exposition (1902).

France, in order to maintain her hold, and seeing her supremacy in the decorative arts severely threatened, formed the «Union des Beaux-Arts Appliqués à l'Industrie» and founded a «Retrospective» Museum for annual exhibitions. This became later the «Musée Nationale des Arts Décoratifs» located in the Louvre, and, with the State factories at Sèvres for porcelains and other enamel techniques, the Gobelins doing decorative art work, the Garde-Meuble (furniture, etc.), France was enabled to at least hold her own with the sharp competition. In England William Morris carried on his decorative arts propaganda backed by such artists as Burne-Jones, Rosetti, Ford Madox Brown, etc., and his workshops (started in 1874) showed fine work in quality and capacity. In 1883 they started the «Art Workers' Guild,» to be continued as the «Arts and Crafts Exhibition Society» (1880–90). In 1885 started the «Birmingham Guild of Handicrafts.» Walter Crane, Professor Lethaby, J. Hungerford Pollen, etc., continued working enthusiastically to further the British decorative arts movements. In recent years the magnificent Victoria and Albert Museum (London) emerged from the less pretentious South Kensington Museum. Summing up the above historic facts we arrive at the following analysis of conditions. The movement brought about by Germany transformed the method of displaying the contents of the museums for archæological, cultural and esthetical purposes into a systematic arrangement for industrial, practical study propaganda. The scheme was so successful in industrial results that the other advanced European nations had to fall into line.

Until quite recent times nothing of this artist-artisan propaganda was practised in the United States. European art students and artisan specialists have found here a free noncompetitive and highly profitable field for their talents. What little has been done to promote native teaching of the decorative arts has been of a sporadic nature, unsupported by the government. Its chief platform has been that of "extension" study in the schools. But a national awakening has taken place. Museums are being opened in all the industrial centres, and all are basing their activities in a systematic teaching of "Art" in a vocational sense; the art museums of New York, Brooklyn, Boston, Philadelphia, Chicago, Pittsburgh, Saint Louis, Buffalo, Worcester, Minneapolis, Cleveland, Toledo, San Francisco, etc., are vying with one another to excel in conceiving methods of teaching art for practical purposes to the neighboring schools with lectures and class visits to the exhibited examples of the Gothic, Renaissance and other periods. Art schools for vocational teaching are multiplying; in New York we have as centres, the Art Students' League, the National Academy of Design, Pratt Institute, the Independent School of Art, the New York School of Fine and Applied Arts, the Beaux-Arts, Cooper-Union, Teachers College, the New York School of Applied Design for Women, etc.; a worthy beginning imbued with an enthusiastic impulse. See also INTERIOR DECORATION.

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CLEMENT W. COUMBE.

DECORATIVE DESIGN. See ART DRAWING.

DECORATIVE PLANTS. See PLANTS, ORNAMENTAL.

DE COSTA, Benjamin Franklin, American clergyman and writer: b. Charlestown, Mass., 10 July 1831; d. New York, 4 Nov. 1904. He entered the ministry of the Episcopal Church and was rector North Adams, Mass. (1857–58); Newton Lower Falls (1858–60); chaplain in the Federal army (1861–63) and rector of the church of Saint John the Evangelist in New York (1863–99). In the year last named he became a Roman Catholic. Included in his many publications are 'The Pre-Columbia Discovery of America by the Northmen' (1869); 'The Moabite Stone' (1870); 'The Rector of Roxburgh,' a novel under the pen-name of William Hickling (1873); 'Verrazano the Explorer' (1880); and 'Whither Goest Thou?' (1902). He became president (1884) of the first branch of the White Cross Society, of which he was the organizer. He was editor also of the *Christian Times, The Episcopalian, The Magazine of American History* and White's 'Memoirs of the Protestant Episcopal Church' (1881).

DE COSTER, Charles Théodore Henri, Belgian poet: b. Munich, 20 Aug. 1827; d. 7 May 1879. He was professor of French literature at the military academy in Brussels. His principal work is the prose epic, 'La légende de Tiel Uylenspiegel' (1867); others are 'Légendes flamandes' (1857); 'Contes brabançons' (1861); 'Voyage de noce' (1872). Consult Potvin, 'Histoire de lettres en Belgique' (1882).

DECOURCELLE, dė-koor-sĕl', **Pierre**, French dramatist: b. Paris, 25 Jan. 1856. His first work was the five-act drama ‘The Ace of Clubs’, written for Sara Bernhardt, which had extraordinary success. This was followed by a succession of comedies, dramas, comic-opera libretti, and dramatizations of popular novels, written by him individually or in collaboration with other authors; among them ‘The Amazon’ (1885); ‘Madame Cartridge’; ‘The Abbé Constantin’ (founded on Halévy's story); and ‘The Man with the Broken Ear’ (after About). He wrote also a sensational novel, ‘The Gray Hat’ (1887), and ‘Fanfan’ (1889), both of which were received with great favor. Among his later works are ‘Gigolette’ (1894); ‘Les deux gosses’ (1896); and ‘Papa la Vertu’ (1898).

DECOY, a place into which wild fowl are decoyed in order to be caught. A decoy pond is kept only in a secluded situation. Several channels or pipes of a curved form, covered with light hooped net-work, lead from the pond in various directions. The wild fowl are enticed to enter the wide mouth of the channel by tamed ducks, also called decoys, trained for the purpose, or by grain scattered on the water. When they are well into the covered channel they are surprised by the decoy-man and his dog, and driven up into the funnel net at the far end, where they are easily caught. There are differences of detail, but the general features of decoys are the same. Consult Grinnell, ‘American Duck Shooting’ (New York 1901).

DECREE, in general, an order, edict or law made by a superior as a rule to govern inferiors. In law it is a judicial decision or determination of a litigated cause. The decree of a court of equity or admiralty answers to the judgment of a court of common law. It differs from a judgment in that the decree decides the justice of the case on the principles involved rather than the right or wrong of the bare question. In ancient history it signified a determination or judgment of the Roman emperor on a suit between parties. In the former German empire the resolutions of the emperor, declared to the estates of the empire, were called decrees. The old name of royal orders in France was *ordonnances* or *lettres*. The national convention, while it possessed sovereign power, used the expression, *La convention nationale décrète;* but the imperial government used the words imperial decree, for instance, in the famous decrees of Berlin and of Milan. In ecclesiastical history the term is especially used with reference to the authoritative decisions of councils; or to a decisioin of the Pope arrived at by consultation with the cardinals. See Berlin Decree; Milan Decree; Decretals.

DECREES OF GOD. This expression is of Calvinistic origin and is found in the Westminster Confession. The term includes the doctrines of predestination, foreordination and election. It has, however, a much wider application and includes the whole plan of God. By implication, also, it includes the doctrine of the sovereignty of God. The entire subject was much debated by Calvinists and Arminians.

DECREPITATION, the crackling noise made by several salts and minerals when suddenly heated. It is accompanied by a violent exfoliation of their particles, and is due to the sudden conversion into steam of the water which is mechanically enclosed between the solid particles of the body; or to the unequal expansion of the laminæ of which the mineral is composed in consequence of their being imperfect conductors of heat. The true cleavage of minerals may be often detected in this way, as they fly asunder at their natural fissures.

DECRETALS, The (*Decretales*), signifying pontifical disciplinary decisions, (1) the second part of the Canon Law or *Corpus Juris Canonici* which contains in five books the papal constitutions, laws, and decisions from the time of Gratian's *Decretum*, 1151 to 1234, when this second part was compiled by Saint Raymond of Pennafort at the order of Gregory IX. The subject matter of each of the five books is expressed in the mnemonic hexameter verse:

Judicium, judex, clerus, connubia, crimen;

meaning that the decretals of the first book relate to the constitution of tribunals, those of the second to the duties of judges, those of the third to the rights, privileges, etc., of the clergy, those of the fourth to marriage, and those of the fifth to offenses against the Church's laws.

(2) *The False Decretals*, or the *Pseudo-Isidorian Decretals*, a collection of decretals, gathered ostensibly by Isidorus Mercator, in the middle of the 9th century. The exact date and authorship of the document are not known; but as a canon of the Council of Paris (829) is quoted, the collection must have been made later than the year in which the council was held. Some modern historians claim that the collection was well known before the year 845; the period has been narrowed down to 847–850. Rheims and Mayence are each given as the place where the work of collating and writing was done. The writer called himself Isidore Mercator (the «Merchant») and in some MSS «Peccator» (the «Sinner»). (The writer may have had in mind the great Saint Isidore, who had previously made a compilation of decrees and canons). Historians claim that the name was, like the decretals, false, and that evidence points to Benedict Levita of Mainz as the compiler. The collection was received at first as authentic. To have at hand and in convenient form all the decrees of councils and the decretal letters of deceased popes, was indeed a boon to be highly appreciated. It was known that letters and documents existed other than those to be found in any collection, so when this collection made its appearance, it was regarded as worthy of praise and thanks.

The collection opened with the 50 apostolic canons received and collected by Dionysius Exiguus; and these were followed by a number of decretal letters said to have been written by early popes, from Clement of Rome, one of the apostolic fathers, to Melchiades, at the end of the 3d century. None of the letters claimed to have been written by popes are genuine. Decrees purporting to have been promulgated at the councils of Nicæa and Seville, came next. Some of these are true. Then came other letters said to have been written by popes, beginning with Sylvester (who succeeded Melchiades) and ending with Gregory the Great. One letter in this collection credited to Pope Siricus (384–399) is genuine. The last part of the compilation is a copy of the canons passed by Gregory II (731) at the council held in Rome. Möhler, the German theologian, in commenting upon the fact that these decretals were at first so well received, almost without a dissenting voice, says: «Pseudo-Isidore seized exactly that in his own age which corresponded to the wishes of all the higher and better order of men. Thence it was that this legislation was so joyfully received. No one suspected anything false, because it contained so much that was weighty and true. If we examine carefully these invented decretals, and try to characterize their composer in accordance with their general import and spirit, we must confess that he was a very learned man, perhaps the most learned man of his time, and at the same time an extremely intelligent and wise man, who knew his age and its wants as few did. Rightly he perceived that he must exalt the power of the centre — that is, of the Pope — because by that way only was deliverance possible. Nay, if we would pass an unconstrained judgment, we may venture even to call him a great man.»

At the time of the appearance of the collection and for centuries afterward, its contents were so in harmony with the leading thoughts of Europe that the whole was accepted without thorough examination or criticism. Nicholas of Cusa, an able theologian of the 15th century, was the first one to express a doubt of the genuineness of the collection, and to advance proofs of the truth of his assertion. The Magdeburg Centuriators began investigations, and then many Protestant critics followed the same line of study, arriving at the same conclusion as that of Nicholas of Cusa. Finally, when the Isidore decretals were examined critically by theologians and historians, it was ascertained that nearly all were forgeries, and that anachronisms and blunders existed in large numbers. Phillips, Hefele, Möhler and others show that in the whole collection there was nothing against the supremacy of the Pope, as had been advanced by some writers; that the letters said to have been written by popes were nearly all false, also that several of the spurious documents existed prior to the 9th century and may have been used in good faith by the compiler. See CANON LAW; CHRISTIAN DOCTRINE, DEVELOPMENT OF.

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DECURIONES, magistrates in the provincial *municipia* of the Roman state, corresponding to the senate at Rome. Originally the popular assemblies had the sovereign power in the *municipia,* and conferred the executive authority upon the decuriones. They consisted at first of 10 men, but in later times they frequently numbered more, and sometimes even amounted to 100. Each *curia decurionum* was presided over by two members who were called *duumviri,* and whose powers within their *municipium* resembled those of the Roman consuls during peace. Under the republic the whole administration of the internal affairs of their respective cities was in the hands of the decuriones, but after the establishment of the empire they exercised nearly all the circumscribed rights of the communities, though finally they were little more than receivers of taxes. The decuriones were created by election, and each decurio was required to be at least 25 years old, and to possess a certain annual income. Their election took place on the kalends of March. Consult Reid, 'The Municipalities of the Roman Empire' (Cambridge 1913).

DEDEKIND, dā'dĕ-kint, Friedrich, German poet: b. Neustadt on the Leine 1525; d. 27 Feb. 1598. His principal work is 'Grobianus' (1549), a satire in Latin distichs against drunkenness and obscenity; it had wide circulation, and was translated into German, Dutch and English. He wrote two dramas having a religious polemic end in view: 'The Christian Knight'; and 'The Converted Papist.'

DEDHAM, Mass., town, county-seat of Norfolk County; on the Charles River about 25 miles from its mouth, and on the New York, New Haven and Hartford Railroad, 10 miles southwest of Boston. The town is one of the oldest in the State, the first settlement within the town's limits, having been made in 1635. The town is noted as having established the first public school in America supported by a general tax (1644). It has considerable manufacturing interests in cotton, wool, carpets, handkerchiefs and clay, but its chief interests are connected with Boston, of which it is practically a suburb. The prominent buildings of the town are the Historical Society building, the county buildings, including the courthouse, jail, and house of correction, and a public library. Water power is obtained from Mother Brook, a canal connecting the Charles and Neponset rivers, built in 1641. The government of the town is administered by means of town meetings. Pop. 10,063. Consult the town records (8 vols., 1635–1890); Mann, 'Historical Annals of Dedham' (Dedham 1847).

DEDICATION, Feast of the (Heb. Chanukka) an annual Jewish festival in commemoration of the purification of the Jehovah Temple in Jerusalem after it had been used for pagan worship by the Syrians and later recovered by Judas Maccabæus. The temple had been dedicated in B.C. 168 to the worship of Zeus Olympius by the then ruler of the land Antiochus IV, Epiphanes, and an altar to the god set up on the altar of burnt offerings. When Judas Maccabæus in B.C. 164–65 drove the Syrians out of Jerusalem, he removed the pagan altar, rebuilt the altar of burnt offerings and purged the temple. It was then rededicated to Jehovah with a series of festivals that covered a period of eight days. There is some doubt as to the exact date when the dedication took place; in 1 Macc. iv, 52–54, the date is given as the 25th of Chislev (December) «the same day the heathen had profaned it,» but the day when the pagan altar was set up is given in 1 Macc. i, 54, as the 15th of Chislev. It is most probable, however, that it took place on the 25th from the manner in which the feast is now celebrated, and from the fact that both nations celebrated the winter solstice on that date. The use of lights is one of the characteristics of the feast, it is called the «Feast of Lights» by Josephus ('Antiq' xii, 7, § 7), and the custom is also mentioned in Talmudic literature. The feast is mentioned only once in the New Testament (John ix, 22) in the following words: «And it was at Jerusalem the feast of the dedication, and it was winter.» Consult Wellhausen, 'Israelitische und jüdische Geschichte.'

DEDLOCK, Lady, the wife of Sir Leicester Dedlock, in Dickens' novel called 'Bleak House.' Outwardly cold and haughty she is inwardly wretched in consequence of being haunted by recollections of her past life, and by fear that the existence of her illegitimate child, Esther Summerson, will be revealed. Lady Dedlock dies at the cemetery where her former lover is buried.

DEDUCTION. Deduction is reasoning from a general principle to other less general truths which are dependent upon this principle. It consists in showing that the general law or principle assumed as the starting point is applicable to a particular subject matter, and in drawing the necessary consequences of its application. The form of this mode of inference is therefore given by the syllogism (q.v.), where the major premise (all M is P) states the general law, the minor premise (S is M) the application to a particular case, from which the conclusion (S is P) follows as a necessary consequence. The principle of this method of reasoning is commonly described as subsumption: the conclusion is shown to fall under or be included in the more fundamental propositions which are assumed as the starting point. These latter propositions can similarly be derived from others of still greater generality, until at last we reach the ultimate principles which form the foundation of all science. As to the foundation on which the ultimate principles themselves rest, various theories have been held. Until comparatively recent times the prevailing view (though by no means universally adopted) has maintained that these propositions neither require nor admit of any demonstration. They are necessary intuitions of the mind whose certainty is direct and immediate, and of a higher type than demonstrations can yield. They thus constitute the basis of all science, since they are the fundamental first truths to which all science appeals as to an unquestioned authority. In the 17th and 18th centuries particularly, mathematics was regarded as the ideal science, and the position of the indemonstrable first principles of all science was often paralleled with that of the axioms of mathematics. It was assumed before the time of Kant that mathematics was wholly a deductive science which derived its results through an analysis of its initial concepts. In like manner it was hoped to put all knowledge on a demonstrative basis by discovering the whole system of necessary truths, and by showing how all particular facts in the various fields could be derived from them; for this would afford the absolute certainty which science was supposed to demand, *i.e.*, every fact would be deduced as a necessary consequence from some general principle. At this time the empirical conclusions reached by inductive reasoning were not regarded as worthy of the name of science, for they are not universal and necessary truths, but only particular and more or less probable.

The development of thought in recent times has, however, entirely revolutionized our ideal of knowledge, and at the same time broken down the sharp distinctions between necessary, or *a priori* principles, and empirical truth, as well as between induction and deduction as contrasted methods of reasoning. It is now widely recognized that there are no *a priori* truths in the old sense; no propositions that are certain in themselves apart from their connection with the rest of experience. It is true, the principles of logic itself and of mathematics, which is a branch of logic, may be said to partake of apriority to such an extent that we are justified, for most purposes, in treating them as quite *a priori*. No matter how ultimate any truth may appear, or how necessary in itself, its certainty and necessity are mediated in and through its relation to other experienced facts with which it is connected in the organic unity of a system. It is only through this systematic connection of the parts of knowledge that any inference is possible. For it is only in a whole, where the parts are systematically connected, that the nature of one part enables us to say what the other parts must be. And when it is seen that reasoning consists in making explicit the systematic connections of facts, the contrast between induction and deduction falls away. The structure of every inference is essentially the same; every inference is constituted by the relating of facts through a general principle. In deduction, as we have seen, the general truth is the starting point and we go on to explicate it in its application to some particular group of facts. On the other hand, the problem may be to find some relating principle for a given group of facts; and here we have to work in the reverse direction, beginning with the particulars and by the use of inductive methods seeking to bring to light some universal principles of connection. There are no sciences which use exclusively either one of these methods. Even mathematics, which popularly is supposed to employ only deductive reasoning, depends for a very essential class of demonstrations, known as existence proofs, on a more or less direct reference to concrete experience; and, on the other hand, the so-called observational sciences reason deductively in tracing out the application of the laws which have already been discovered and the consequences of the hypotheses which are employed. In every field thought uses all the means and methods which it can command to aid in solving its problems. Induction and deduction, observation and reasoning, are not separate and isolated processes, but functions of the knowledge-process which are supplementary and go hand in hand. See INDUCTION, MATHEMATICAL; LOGIC.

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DEE, John, English astrologer: b. London, 13 July 1527; d. Mortlake, England 1608. In early life he had devoted much of his time to mathematical, astronomical and chemical studies; and in 1548 rumors began to prevail that he was addicted to the black art. They were probably well founded; and to avoid the consequences he went abroad. In 1551 he returned to England and through the instrumentality of Cecil, who presented him to Edward VI, obtained a pension of 100 crowns. The suspicion of the black art appears still to have clung to him, and shortly after Queen Mary's accession he was charged with practising against the queen's life by enchantment and imprisoned. He obtained his liberty in 1555 and after Queen Elizabeth's accession was consulted by Lord Dudley as to "a propitious day" for the coronation. Lilly's account of him is that he was the queen's intelligencer, with a fixed salary; a great investigator of the more secret hermetical learning, a perfect astronomer, a curious astrologer, a serious geometrician and excellent in all kinds of learning. The nature of his employments excited strong suspicion and in 1576 he was furiously attacked by a mob, from which he had difficulty in escaping with his life. In 1578 during an illness of the queen, he was sent to consult with the German physicians and philosophers as to her recovery and after his return was employed to draw up a sketch of the countries which, from having been discovered by English subjects, belonged to the crown. He accordingly prepared two rolls, giving both a geographical description and a historical acccount of the countries. These curious documents are still extant in the British Museum. After many wanderings, Dee, returning home, obtained from the queen in 1594 the chancellorship of Saint Paul's Cathedral and in 1595, the wardenship of Manchester College, which he held nine years. It has been supposed, with some plausibility, that Dee's character as an alchemist was merely assumed to enable him to act more securely and effectually as a spy in the employment of the English government. His writings on the occult sciences were published in 1659.

DEE, the name of several British rivers. 1. A river in Scotland, partly in Kincardineshire, but chiefly in Aberdeenshire, one of the best salmon rivers in Great Britain. It rises on the southwest border of Aberdeenshire in the Cairngorm Mountains and flows generally east, 87 miles to the North Sea. Its total course is 96 miles. The city of Aberdeen is at its mouth. 2. A river of North Wales and Cheshire; rises in Lake Bala, Merionethshire; flows north-northeast and northwest to the Irish Sea, 20 miles below Chester; length, about 70 miles. 3. A river of Scotland, county of Kirkcudbright, rises in Loch Dee. It flows southeast and south into Kirkcudbright Bay; length, 50 miles.

DEED, a written instrument under seal, containing a contract or agreement which has been delivered by the party to be bound and accepted by the obligee or covenantee. It has also been defined as follows: "A writing containing a contract sealed and delivered by the party thereto." (2 Wash. Real Prop. 553.) The law requires greater form and solemnity in the conveyance of land than in that of chattels. This arises from the greater dignity of the freehold in the eye of the ancient law, and from the light and transitory nature of personal property, which enters much more deeply into commerce, and requires the utmost facility in its incessant circulation.

In the early period of English history the conveyance of land was ordinarily without writing, but it was accompanied with certain acts, equivalent, in point of formality and certainty, to deeds. As knowledge increased, conveyance by writing became more prevalent and ultimately by the statute of frauds and perjuries, of 29 Charles II, ch. 3, secs. 1, 2, all estates and interests in lands (except leases not exceeding three years) created, granted, or assigned, by livery of seisin only, or by parol, and not in writing, and signed by the party, were declared to have no greater force or effect than estates at will only. And by the fourth section no person could be charged upon any "contract or sale of lands, or any interest in or concerning the same," unless the agreement, or some memorandum or note thereof, was in writing, and signed by the party to be charged therewith, or some other person by him lawfully authorized.

With some trivial changes this statute provision has been adopted or assumed as law throughout the United States. Deeds must be upon paper or parchment, must be completely written before delivery, must be between competent parties, and certain classes are excluded from holding lands and, consequently, from being grantees in a deed; must be made without restraint; must relate to suitable property, and should be signed, sealed and delivered. The consideration of a deed must be good or valuable and not partaking of anything immoral, illegal or fraudulent.

A deed to be effective must be delivered and accepted. A delivery is the transfer of a deed from the grantor or his agent to the grantee, or some other person acting in his behalf, in such a manner as to deprive the grantor of the right to recall it at his option. An absolute delivery is one which is complete upon the actual transfer of the instrument from the possession of the grantor. A conditional delivery is one which passes the deed from the possession of the grantor, but is not to be completed by possession in the grantee, or a third person as his agent, until the happening of a specified event. A deed delivered in this manner is an *escrow,* and such delivery should be always made to a third person. No particular form of procedure is required to effect a delivery. It may be by acts merely, by words merely, or by both combined, but in all cases an intention that it shall be a delivery must exist. It may be made by an agent as well as by the grantee himself. To complete a delivery, an acceptance must take place, which may be presumed from the grantee's possession.

In a deed the premises embrace the statement of the parties, the consideration, recitals inserted for explanation, description of the property granted, with the intended exceptions. The *habendum* begins at the words "to have and to hold," and limits and defines the estate which the grantee is to have. The *reddendum,* which is used to reserve something new to the grantor; the conditions; the covenants; and the conclusion, which mentions the execution, date, etc., constitute the formal parts of a deed and properly follow in the order observed here.

The construction of deeds is favorable to their validity; the principal includes the incident; punctuation is not regarded; a false description does not harm; the construction is least favorable to the party making the conveyance or reservation; the *habendum* is rejected if repugnant to the rest of the deed. The *lex rei sitæ* governs in the conveyance of lands, both as to the requisites and the forms of conveyances.

Chancellor Kent, after observing that in the United States generally the form of conveyance is very simple, says: «I apprehend that a deed would be perfectly competent, in any part of the United States, to convey the fee if it was to the following effect: 'I, A. B., in consideration of one dollar to me paid by C. D. do grant, bargain and sell to C. D. and his heirs, the lot of land (describe it), witness my hand and seal, etc.'» See COVENANT; ESCROW.

DEEG, dēg, India, town and dismantled fortress in Rajputana, state of Bhurtpore, 24 miles west of Muttra. It is a walled town, is situated in the midst of marshes, and almost surrounded by water during a great part of the year. At the southwest corner is the lofty rock of the Shah Boorj, on which the citadel stands. Deeg is a place of great antiquity, and contains remarkably fine palaces, only surpassed in beauty by the Taj Mahal of Agra. Holkar was defeated here by the British under General Fraser in November 1804, and the following month the town and fortress were taken.

DEEMS, Charles Force, American clergyman and writer: b. Baltimore, Md., 4 Dec. 1820; d. New York, 18 Nov. 1893. He was graduated at Dickinson College in 1839, became professor of logic and rhetoric in the University of North Carolina (1842–47); of natural sciences at Randolph Macon College 1847–48. Becoming a Methodist minister at Newbern, N. C., he was from 1850–54 principal of the Greensboro Female College, N. C. From 1866 to his death he was pastor of the Church of the Strangers of New York, and was widely known as editor and author. He founded the American Institute of Christian Philosophy in 1881, and edited its journal *Christian Thought.* A lectureship in philosophy was founded at New York University in his name in 1905. Included in his publications are 'Triumph of Peace and Other Poems' (1840); 'The Light of the Nations' (1870); 'Weights and Wings' (1872); 'Chips and Chunks for Every Fireside'; and 'My Septuagint' (1892); 'Life of Jesus' (1872); the Gospel of Common Sense as Contained in the Canonical Epistle of James' (1889); 'The Gospel of Spiritual Insight and Studies in the Gospel of Saint John' (1891). His autobiography with a memoir was edited by his sons (New York 1897).

DEEMSTER, an officer once attached to the high court of justiciary in Scotland, who formally pronounced the doom or sentence of death on condemned criminals. The office was conjoined with that of executioner. The name is now given in the Isle of Man to two judges who act as the chief justices of the island, the one presiding over the northern, the other over the southern division.

DEEMSTER, The, a novel by Hall Caine, called by the author the story of the Prodigal Son. It was published in 1877. The scene was laid in the Isle of Man, and opens in the latter part of the 17th century. The Deemster is Thorkell Mylrea, whose nephew Dan, the prodigal, deeply loves his cousin Myra; but her brother Ewan interferes and a duel ensues, resulting in the death of Ewan. Dan is tried and is declared cut off forever from his people, and banished to a remote corner of the island. During a visitation of the plague, Dan takes the place of Father Dalby, the Irish priest, effecting many cures and at last dying of the pestilence. A dramatization of 'The Deemster' was produced by Wilson Barrett under the title 'Ben-Ma-Chree'.

DEEP BOTTOM, Va., Battles at. 1. On 25 July 1864, General Grant, then besieging Petersburg, ordered a movement, the principal object of which was to threaten Richmond and draw as many of Lee's troops as possible from the lines in front of Petersburg, so as to give promise of success in assaulting them, upon the springing of a mine prepared by General Burnside. Deep Bottom is opposite a great bend of James River, making a neck of land known as Jones' Neck, at a point where Bailey's Creek flows into the James from the north. Butler's pontoon bridges, one below and one above the mouth of the creek, were held by General R. S. Foster with a brigade of the Tenth corps. The Confederates were entrenched on the west side of the mouth of the creek in Foster's front. About 2 A. M. of the 27th, Hancock began crossing the James by the lower bridge, to turn the Confederate left, while Foster attacked the right. At daylight all moved forward. Gen. Nelson A. Miles' brigade drove the Confederates from their position on the New Market road, east of the creek, and captured a battery of heavy guns, but progress across the creek was barred. From the river to Fussell's Mill, a distance of about two miles, its west bank was held by Kershaw's and Wilcox's divisions, joined during the day by Heth's division. On the morning of the 28th, Kershaw advanced on the Charles City road and drove Sheridan back over a ridge upon which he was posted; but Sheridan, dismounting his men, drove Kershaw back in some confusion, taking 200 prisoners and two colors. Reinforcements arrived until five-eighths of Lee's army was now north of the James. Grant wanted no assault made, and on the 29th Hancock and Sheridan recrossed the James. The Union loss in this movement was 334 killed and wounded.

2. General Grant, on 12 August, ordered another movement on the north side of the James to threaten Richmond. Hancock's Second corps, part of the Tenth corps, under General Birney, and General Gregg's division of cavalry, were designated for the purpose. Birney's command was at and near Deep Bottom; the cavalry and artillery went by land, as in July; and Hancock's corps marched to City Point and took steamers for Deep Bottom, 16 miles up the river, where it was landed on the morning of 14 August. Mott's division was to advance on the New Market road and drive the Confederates into their works beyond Bailey's Creek, while Barlow, with his own division and Gibbons', was to move on Mott's right, and assault the line near Fussell's Mill. Gregg's cavalry was to cover Barlow's right, and when the infantry uncovered the Charles City and Darby roads, was to make a dash on Richmond, if opportunity offered, and if not, to destroy the railroads entering it. Birney was to attack the Confederate right, and, if successful, move up the river roads on Chaffin's Bluff. Field's Confederate division held Bailey's Creek and Wilcox's division was

at Chaffin's Bluff. At the first intimation of Hancock's movement Wilcox moved up and joined Field, and from the south side of the James, General Lee sent Mahone's division of infantry and the two cavalry divisions of Wade Hampton and W. H. F. Lee. Johnson's and Gary's brigades followed, and there were three regiments from Pickett's division. Mott advanced on the New Market road, but was checked at the creek. It was 4 o'clock before Barlow, on his right, could get up one brigade, and with this he assaulted the position near Fussell's, was repulsed, and rested for the night. On the right Gregg had advanced well up the Charles City road, and on the left Birney seized a part of the Confederate line and captured three guns. On the morning of the 15th Birney's corps and a brigade of Mott's division endeavored to turn the Confederate left. Birney moved toward the Charles City road, on which Gregg was advancing, but he made so wide a detour and found so many obstructions, that it was night when he found his proper position, and attack was deferred until morning. As a diversion to his attack Gregg's cavalry, supported by Miles' brigade of infantry, were to move up the Charles City road. Gregg was off at an early hour of the 16th, driving the Confederate cavalry beyond Deep Creek, as far as White's Tavern, only seven miles from Richmond. At 10 A. M. Terry's division of Birney's corps, supported by Craig's brigade of Mott's division, and Birney's brigade of colored troops, advanced against the Confederate line near Fussell's Mill, and, after a severe fight, carried it, taking three colors and between 200 and 300 prisoners from Mahone's and Wilcox's divisions; but the Confederates soon rallied, retook their works and drove Terry back. Soon after noon the Confederate cavalry, supported by infantry, advanced on Gregg and Miles, slowly driving them back to Deep Creek, and later in the day across it. There was a cessation of hostilities on the 17th. On the 18th the Confederates advanced from their works above Fussell's Mill and attacked Birney, who, with the assistance of Miles, repulsed them. On the night of the 20th the Union troops were withdrawn and returned to their positions in front of Petersburg and at Bermuda Hundred. In this battle the Union troops numbered about 28,000, the Confederates about 20,000. The Union loss was 2,161 killed and wounded, and 625 missing. There are no returns of Confederate losses. Consult 'Official Records' (Vol. XLII); Humphreys, 'Virginia Campaign of 1864–65'; Grant, 'Personal Memoirs' (Vol. II); Sheridan, 'Personal Memoirs' (Vol. I); Walker, 'History of the Second Army Corps.'

E. A. Carman.

DEEP RIVER rises in Guilford County, N. C. Its general direction is southeast to Chatham County, where it unites with the Haw River and forms the Cape Fear River. Its length is about 125 miles; it has good water power, some of which is utilized at Lockville. It is navigable to Carbonton.

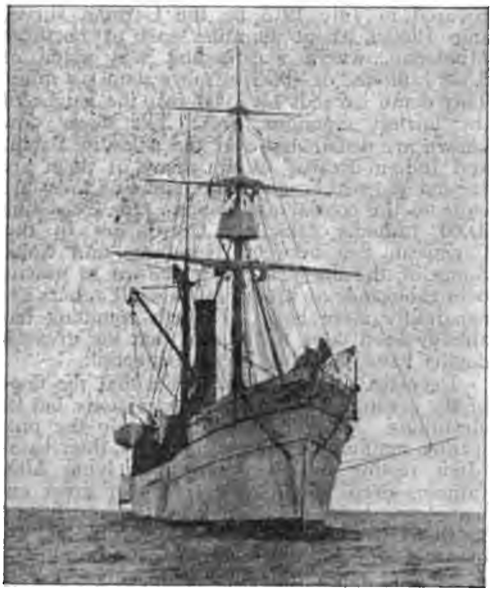
DEEP-SEA EXPLORATION. While the beginnings of our knowledge of the surface of the sea date back to the earliest recorded voyage of discovery, the physical conditions obtaining in the depths of the great oceans have been ascertained chiefly during the past half century.

The modern science of oceanography (q.v.) is based largely upon the voyages of a score or more of vessels sent out by various governments for the special purpose of making physical and biological investigations of the oceanic basins.

As late as Captain Cook's time the ocean had been sounded no deeper than a few hundred fathoms. For scientific attempts to ascertain depths far from land, it is scarcely necessary to go back farther than a century and a half, and it was not until the day of submarine cables that systematic soundings were taken.

The dredge has been employed by naturalists in obtaining marine forms in shallow water for a century and a half, but its use in ocean depths has been limited to about half that period.

The governments that have participated largely in modern deep-sea exploration are the English, French, German, Austrian, Dutch, Russian, Norwegian, Swedish, and by no means the least, that of the United States. The foundations of oceanography as a science were laid by the British in the publication of the results of the famous *Challenger* Expedition. The investigations of this vessel were followed by those of American vessels, one of which, the *Albatross*, is perhaps better equipped for such work than any other vessel afloat, and has been in commission for more than thirty years.


The Albatross Dredging at Sea.

Deep-sea explorations have now been carried into all seas and the general conditions of temperature, depths, and animal life in the great oceanic areas are no longer unknown, while the literature of oceanography occupies an important place in science.

The deep-sea exploring vessel of the present time might properly be described as a floating laboratory, equipped for hydrographical, meteorological, geological and biological investigations. The equipment would include not merely that of a general scientific laboratory, but also the heavy apparatus necessary for sounding and dredging. The ship machinery for deep-sea work has been gradually brought to a state of high efficiency. Soundings formerly made with rope are now made with a single strand of wire, and instead of the stout rope cable for dredging, light wire rope of great strength is employed. Various self-recording instruments have gradually been perfected for quick and accurate work in taking deep sea temperatures and in the collecting of small forms of life at intermediate depths.

Sounding.—During the course of deep-sea exploration, many soundings have been made in depths exceeding 3,000 fathoms. More than 50 great depressions, or «deeps» as they have been called, are now known, varying from 3,000 to 5,000 fathoms. Ten of these exceed 4,000 fathoms. It is only in the western Pacific that depths exceeding 5,000 fathoms have been found. The greatest depth known was discovered in July 1913 by the German survey ship *Planet,* about 40 miles east of northern Mindanao, where a sounding was made of 5,348 fathoms, or 406 feet more than six miles. This depth exceeds by 3,000 feet the height of the loftiest mountain peak. The deeps now known are distributed over the Atlantic, Pacific and Indian oceans. While many of them are far out in great ocean basins, some of them are close to the continental slopes. One exceeding 3,000 fathoms (Bartlett Deep) lies in the Caribbean Sea between Honduras and Cuba. Some of the deeps are now known to extend over thousands of square miles while others are apparently mere holes. Enough sounding has already been done to indicate that the greatest depths have probably been discovered.

Deep-sea sounding has shown that the floor of the ocean has not only its depressions, but its elevations. Many islands are merely the projecting summits of submarine peaks, their bases often resting on an ocean floor lying 3,000 fathoms deep. Submarine ridges of great extent have been discovered in the north and south Atlantic. The average depth of the ocean is probably not less than 2,200 fathoms.

Several types of sounding machines are in use, but whatever the pattern, each contains a reel wound with thousands of fathoms of piano wire. In the operation of sounding, a detachable shot weighing from 30 to 60 pounds is employed to draw the wire rapidly and steadily from its reel. It is secured to the sounding rod at the end of the line in such a manner as to become detached when the bottom is reached. Several instruments are sent down at each operation. The sounding rod is provided with a device for bringing up a specimen of the bottom mud. A few feet above it are attached the deep-sea thermometer and water bottle. The latter secures its sample of water at the bottom only. All deep-sea instruments are necessarily self-acting at the bottom and thermometers are so constructed that they will not be effected by higher temperatures on being brought toward the surface. While the sounding instruments are carried down by the heavy shot, the wire is reeled in by steam power. It takes about one hour to make a sounding three miles deep and reel in the line with its attached instruments.

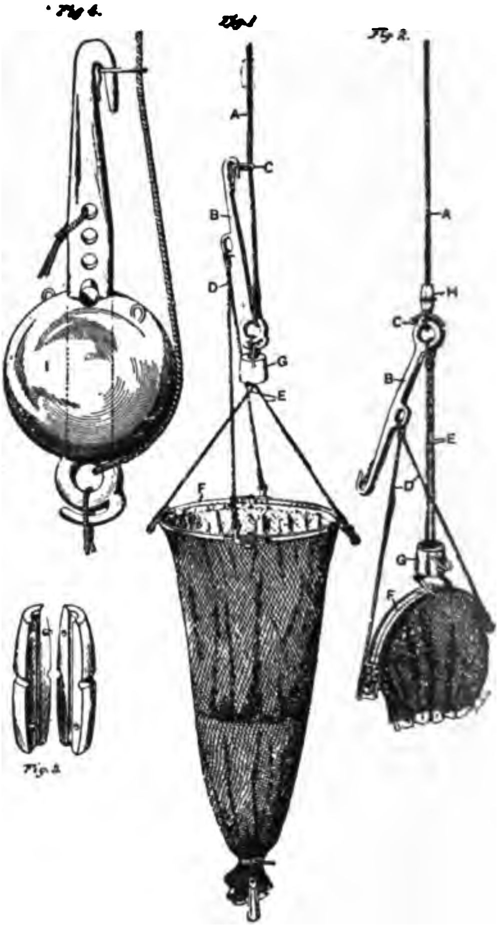


Fig. 1.—Showing net in position for lowering and towing: a, Tow line; b, Tripping arm; c, Tripping ring; d, Opening slings; e, Closing slings; f, Folding net ring; g, Closing weight; h, Closing messenger. (See also Fig. 3.)
Fig. 2.—Showing net closed for heaving in.
Fig. 3.—Closing messenger.
Fig. 4.—Showing heavy tripping arm used on steamer *Albatross,* with 60-pound sounding shot attached as sinker for proper strain on wire tow line in deep-sea work. i. Common sounding shot — 60 pounds.

Dredging.— For the collecting of animal life from the bottom, the dredge is employed. This may be described as a bag-shaped net about 20 feet long, fitted with an iron-framed mouth from 8 to 12 feet wide and 3 or 4 feet high. It is towed by a wire cable about one-third of an inch in diameter, its length depending upon the region to be investigated. The cable is operated by a powerful engine on the main deck, and the cable itself is coiled upon a reel sufficiently large to contain the whole of it. The dredge sinks by its own weight, which is sufficient to carry down the dredge line with it, the only weights ordinarily used being small ones to carry the end of the net down below its iron-framed mouth and prevent its fouling. When dragging along the bottom, it usually fills rapidly. Very often the hauls of animal forms are large, but the dredge is more often heavily loaded with oozes of various kinds in which animal forms are imbedded. The dredge rope is passed over the side of the ship from the end of a boom, the top of which is guyed to the mast with a spring to relieve strain. The spring or accumulator is graduated and often shows the dredge to be pulling thousands of pounds. The net is sometimes too heavily loaded to be lifted, and may be torn from its frame. Much of the deep-sea mud or ooze washes away during the progress of the dredge toward the surface and under ordinary conditions its load is no greater than can be lifted from the water and swung on board with safety.

Dredges are of several forms, the commonest being that of the beam trawl employed by fishing vessels in shoal water, but with a shorter beam. For convenience we shall refer to all appliances used for collecting at the bottom as *dredges*. For the exploration of intermediate depths, several types of nets are employed which can be opened and closed by devices operated by metal messengers sent down the dredge line. Various devices are used for collecting forms of life in deep water, such as the otter net and other appliances well known to fishermen. The surface and intermediate depths of the sea bear forms of life for the capture of which fine-meshed tow nets are used.

Before using the dredge or beam trawl, the depth is ascertained by sounding. In dragging the dredge upon the bottom it is necessary to let out considerably more line than the actual depth, and the dragging of the dredge along the bottom can often be felt by merely placing the hand upon the dredging cable. The deepest dredge haul ever made (that taken by the *Albatross* off the Tonga Islands in the South Pacific) was 4,173 fathoms, and the time required from the moment the dredge was put overboard until brought to the surface was about 10 hours. On very rough bottom, where dredging nets may be torn from their frames, the "tangle" is often used. This apparatus consists of bunches of shredded rope attached to iron bars, and is effective in obtaining starfishes, sea urchins, crinoids and other creatures which have their surfaces sufficiently rough to become entangled in the loose strands of rope. Fish traps of special design have been used successfully at great depths, and the *Albatross* has succeeded in taking fishes at a depth of a thousand fathoms with ordinary gill nets.

Deep-Sea Life.— As plant life does not exist in the sea at depths below the influence of sunlight, we find at the bottom and at intermediate depths, forms of animal life only. These consist of fishes, mollusks, crustaceans, medusæ, echinoderms and representatives of practically all of the classes of marine life to be found living in shallow waters under the influence of sunlight, but of very different genera and species. When deep-sea investigations began, it was hoped that archaic forms would be discovered; but this hope has not been realized except in slight degree. Animal forms are sometimes brought up by the dredge in great abundance. It is not an uncommon thing to obtain several barrels of crustaceans, starfishes, mollusks or echinoderms, at a single haul. The dredge of the *Albatross* once brought up 800 fishes from a depth of 1,770 fathoms. The fact that the *Albatross* obtained living sponges at 4,178 fathoms indicates that there is probably no depth too great for the existence of animal life.

Surface Life.— The surface life of the sea consists of both plant and animal forms, the latter in great variety. It is usually minute, and much of it phosphorescent. It is the small life at or near the surface and now collectively called plankton, which makes the phosphorescence with which travelers at sea are familiar. It is more abundant in some regions than in others, and constitutes the food not only of many of the larger animals living at the surface, but is the basis of the food supply of all creatures living at the bottom and intermediate depths. These small forms are constantly dying and falling to the bottom. Indeed, their dead shells and skeletons cover great tracts of the ocean floor in the regions where they abound. The crustacea are doubtless the most abundant of these pelagic forms, but almost all classes are represented, including mollusks, worms, cœlenterates, tunicates, protozoans, fishes and even reptiles. In the colder waters of the ocean the tow nets used in taking plankton fill very rapidly with certain forms which swarm in cold waters; but in tropical waters the variety of forms is greater, although usually less abundant. Several forms of nets are used in taking the plankton, but all are lined with fine gauze or silk bolting cloth. Under the most favorable conditions the dragging of such nets at or near the surface often yields enormous quantities of surface forms. When the ship is at rest in favorable weather, surface life is readily attracted to insulated electric lights lowered a few inches below the surface of the water where it can be gathered from the deck with long-handled gauze-lined dip nets.

Great currents like the Gulf Stream, drift the surface life of warm regions into colder waters where it is killed by the lower temperature and deposited in great quantities upon the bottom. In such places the dredges have taken bottom forms in greatest abundance. There are, however, wide areas such as those of mid-Pacific regions, which are almost devoid of surface forms, and where the bottom is correspondingly lacking in animal life.

Marine Deposits.— Geology, like zoology, is also dependent upon the deep-sea dredge for what is known of the floor of the ocean. The deposits may be referred to three groups: Those derived from the land through the action of rivers and currents and called terrigenous deposits. They consist of muds of various kinds which are characteristic of the adjacent lands from which they have been derived. Farther off, and beyond the influence of rivers, are the pelagic deposits which are made up of dead organisms originating at the surface. These are usually found in the form of diatom, radiolarian, or globigerina oozes, depending upon the character of the surface life prevailing above them. Still farther from land, in the deeper parts of the ocean, are the red clay deposits, which are believed to cover about half of the floor of the ocean. These deposits receive the minimum of dead matter from the surface, and are far beyond the influence of matter washed from the continents. The red clay deposits are believed to have formed very slowly, and to have been subjected to little change during long periods of time.

Light.— The most recent investigations have shown that light does not penetrate deeper than five or six hundred fathoms, and even there is very dim. Experiments with the photometer have shown that light penetration is greater in tropical than in northern waters. A photographic plate exposed at a depth of 900 fathoms for two hours, was in no way affected. Below the levels reached by sunlight, the sea is in total darkness, and plant forms, with the exception of diatoms, are unknown. There is, however, some phosphorescent light, as the deep-sea dredge has brought up many fishes and invertebrates with phosphorescent organs. Such light must, however, be very faint and unevenly distributed.

Notwithstanding the absence of light, a considerable number of deep-sea forms are brilliantly colored, brilliant reds being often found. Most of the deep-sea fishes are, however, black or grayish. Starfishes and crustaceans are frequently red or pink, while holothurians are often violet.

There is a great variation in the size of the eye among deep-sea fishes, which is doubtless dependent to some extent upon the penetration of sunlight or the existence of phosphorescence, their eyes ranging from very minute to abnormally large. A number of the deep-sea species are totally blind.

Temperature.—The influence of the warmth to be found in the surface waters does not extend below a few hundred feet, even at the equator where such warmth is greatest. Below 900 fathoms the temperature is always within three or four degrees of the freezing point of fresh water. The low temperature at the bottom is caused by the settling of cold surface water in polar regions. The cold water thus slowly distributed over the floor of the ocean carries with it the oxygen necessary for the maintenance of life in the depths. The bottom of the Black Sea, receiving no such supply of polar water, is devoid of animal life. All deep-sea life would doubtless perish were it not for the air thus brought down.

Salinity.— Studies of the salinity of the ocean, based on samples of water secured by special forms of apparatus from all depths, have shown various degrees of salinity in different seas. Sea saltness in the Atlantic is higher than in other great open oceans, and highest of all in the Red Sea and in the Mediterranean. It is remarkably low in the Black Sea and in the Baltic, where there are many rivers but no great evaporation.

Pressure.— Sea pressure amounts to about a ton to the square inch with each 1,000 fathoms of depth. At 1,000 fathoms it amounts to 180 atmospheres, while at the greatest depth known (over 5,000 fathoms), the pressure would be about six tons to the square inch. It is evident that animal forms of the surface regions could not endure such conditions, but the tissues of deep-sea animals are so permeated by fluids, that a balance is maintained. Most of the deep-sea forms are so soft that when brought to the surface they require various laboratory hardening processes for their preservation as specimens. Both fishes and invertebrates, when brought up from the greater depths, are always dead, and probably die before being dragged far from the bottom. It is interesting to note, however, that the *Albatross* has taken alive fishes from 590 fathoms, and large Lithodes crabs from 735 fathoms.

Size of Deep-Sea Forms.— The dredges hitherto used in deep-sea exploration have secured no fishes or invertebrates of large size. The largest fishes taken seldom exceed four or five feet in length. It is not unlikely that by using larger dredges, with wider-meshed nets less liable to become overloaded with mud, larger animals could be captured.

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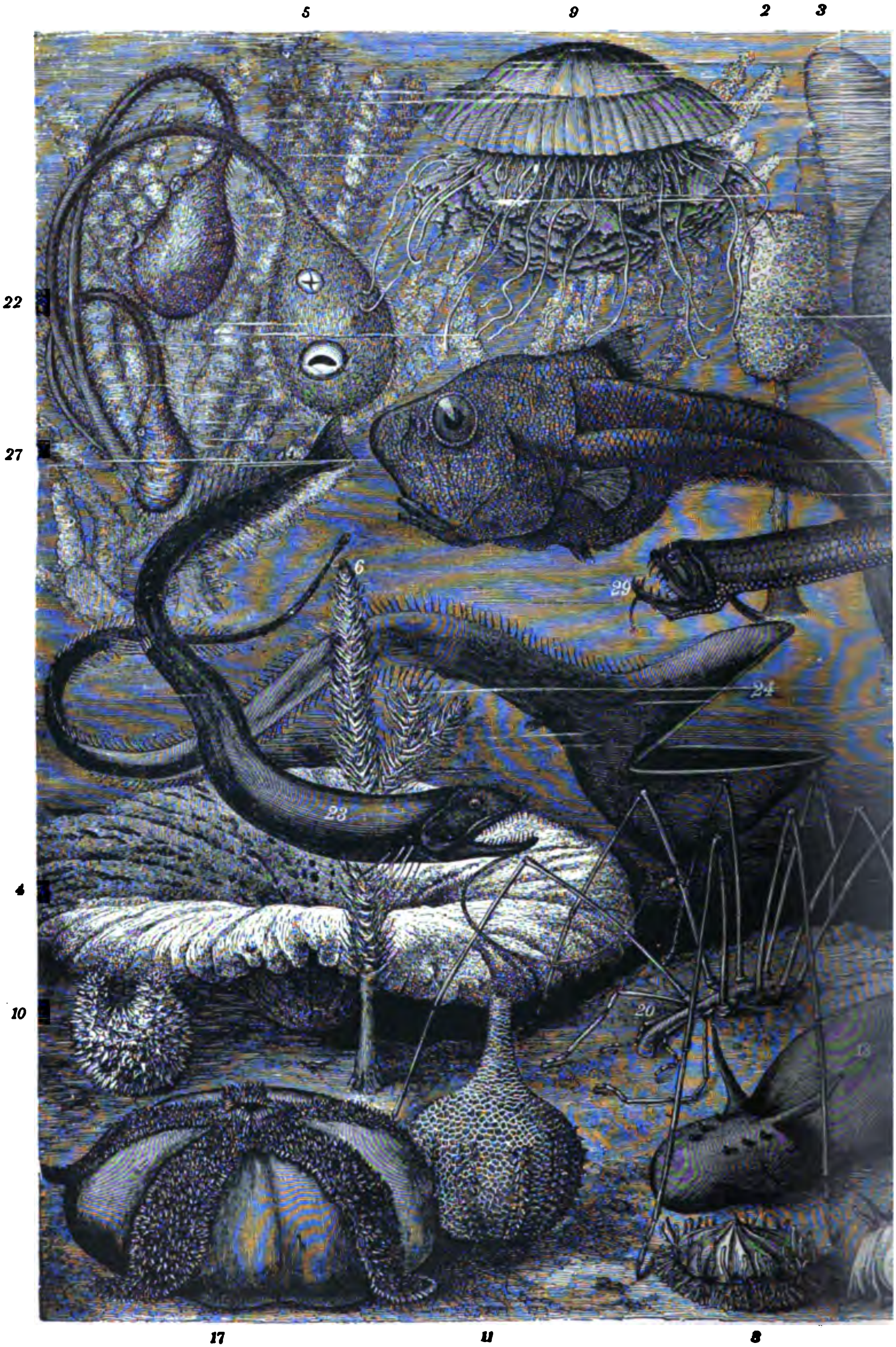
DEEP-SEA LIFE. In this account of midoceanic, or «pelagic,» life the writer purposes to restrict himself to the open ocean, that is the spaces of deep water covering the real oceanic basins. The great land-masses are bordered by a submerged rim of varying width, where the water does not exceed an average depth of 100 fathoms, beyond which the bottom falls or slopes to the plain of the original ocean-basin. The sum of these continental borders and similar shallows elsewhere, as in the archipelagic region of the western Pacific, forms only about 15 per cent of the 140,000,000 square miles of salt water, leaving more than four-fifths of it deeper than 100 fathoms, while nearly 10,000,000 square miles exceeds 3,000 fathoms in depth.

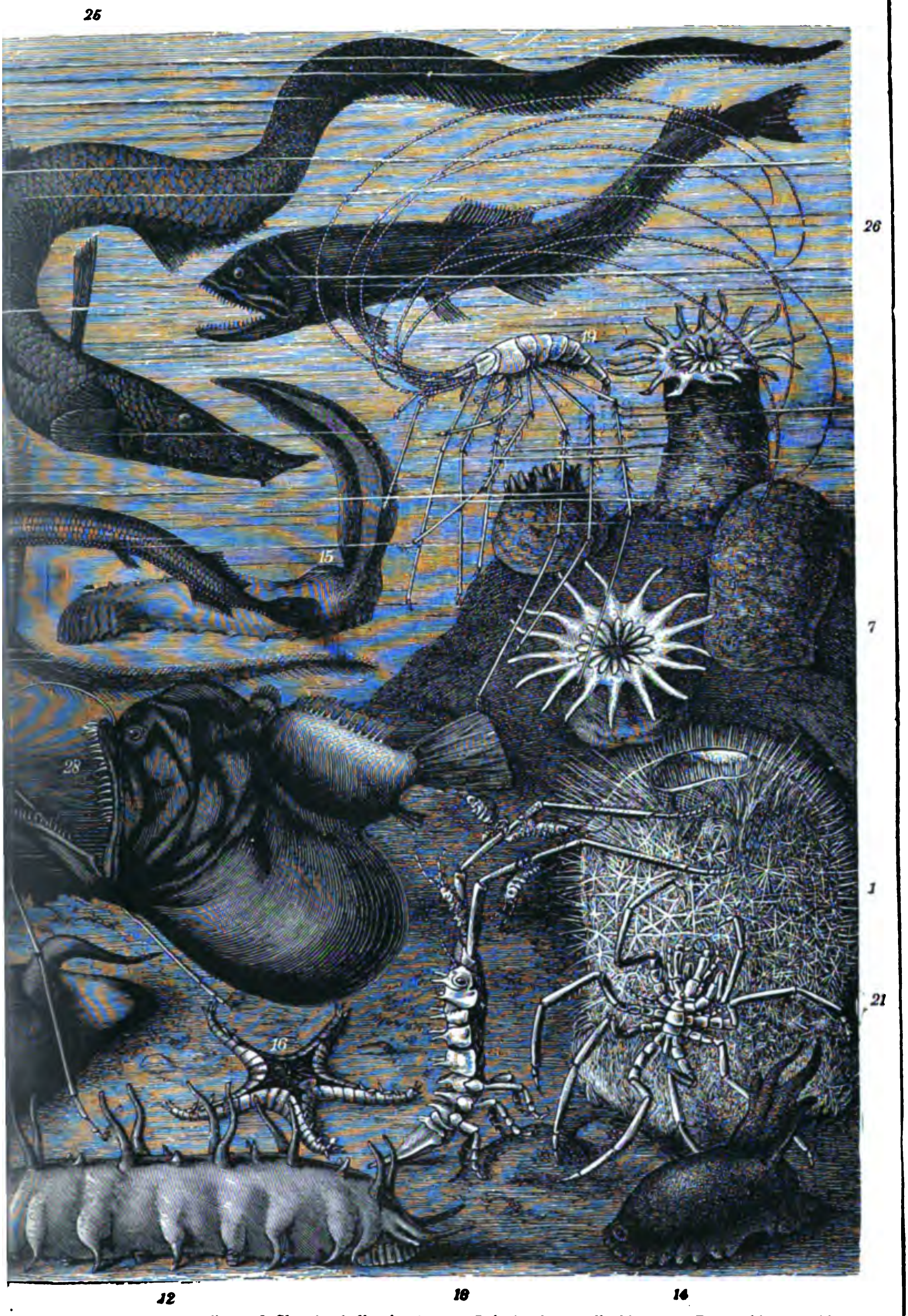
We speak of «oceans,» but in reality it is all one body of water, which by a constant interchange through currents both horizontal and vertical, maintains a virtual uniformity, yet not a complete one, since distinct variations are observable in temperature, density (salinity), pressure and other physical characteristics that influence animal being. Therefore some parts of the ocean are more populous than others; some are more populous in summer and less so in winter, and there is a definite (although as yet undetermined) geographical distribution of marine life, both horizontal and vertical.

Ocean Floors.— The character of the bottom must be considered. The rivers discharge into the ocean daily an enormous amount of land-material, which is sorted out by weight, readiness to dissolve, etc., and by the action of waves and currents, and is spread out on the bottom to a greater or less distance according to circumstances, but nowhere goes far from the coast. This outer border of deposits from rivers shows a bottom of bluish mud, or, in places, of coral sand or of volcanic dust. It is rich in food-material, and supports in the water above it a far larger assemblage of plants and animals than does the sea outside of

DEEP



1 Pheronema Carpenteri 2 Hyalonema Sieboldii 3 Semperella Schultzei 4 Dactylocalyx pumiceus
9 Drymonema Victoria 10 Ypsilothuria attenuatta 11 Rhopalodina Heurteli 12 Oneiroph
16 Styracaster spinosus 17 Hymenaster rex 18 Arcturus Baffini 19 Nematocarcinus gracilipes
24 Eurypharynx pelecanoides 25 Halosaurus macrochir 26 Neostoma bathyp



5 Sclerothamnus Clausii 6 Chondrocladia virgata 7 Actinotheca pellucida 8 Pectanthis asteroides
anta mutabilis 13 Euphronides Talismani 14 Peniagone rosea 15 Psychropotes buglossa
20 Colossendeis Titan 21 Nymphon robustum 22 Boltenia pedunculata 23 Eustomias obscurus
hilum 27 Macrurus globiceps 28 Melanocetus Johnstoni 29 Stomias boa

it. We have no further concern with this littoral rim further than to point out that, by means of currents, it contributes considerable food to pelagic animals. The floor of the vast spaces of ocean-bottom shows none of this land mud, but is covered with deposits of three kinds. The most extensive of these is a red clay, which covers the bottom in the great bight of the Atlantic between North and South America west of the 50th meridian, a large part of the mid-Atlantic, and most of the floor of the Pacific and Indian Oceans; it is believed to have been derived from the decomposition of submarine rocks, and of pumice and other volcanic débris showered into the sea, mainly in past ages.

Scarcely less widespread is a loose deposit called «ooze,» composed almost exclusively of the remains of minute animals and plants that have silicious or lime-carbonate skeletons which have sunk down from the surface. All over the bed of the Atlantic, except where the red clay appears, the ooze shows more tests of the protozoan *Globigerina* than of anything else, and it is therefore known as globogerina ooze. Pteropod ooze, patches of which occur here and there, has a predominance of pteropod shells; and so on. Bottom of this kind is far more thickly inhabited by benthonic (deep-sea) animals than is the clay bottom; and it lies under the paths of the great oceanic currents, whereas the red clay underlies chiefly the areas of comparatively stationary water — the great eddies in the oceans.

These oozes imply an abundant life in the open sea. What is its character and how does it exist in a world of only sea-water?

Factors of Deep-Sea Life.— First we must glance at certain conditions. The pressure exerted by water on anything lowered into it increases at a rapid rate as you go down, so that at a depth of only 500 fathoms it equals about 100 times that at the surface. This contributes to the density of the underlying water. The saltiness of the sea also contributes to its density, but varies somewhat according to local conditions, and decreases slightly from the surface downward.

More important than either in its effect on life is temperature, the factor determining to a great extent both the amount and the distribution of marine life. In the middle of the Atlantic, near the equator (Sargasso Sea), the water at the surface in summer, will be about 22.30° C., and at 100 fathoms of depth about 16.70° C., below which it diminishes more slowly to about 2.25° C. at 2,000 fathoms, and to below the zero of centigrade (freezing-point of Fahrenheit) in the deeps. The temperature, density, etc., below a few hundred fathoms are probably fairly constant for each measure of descent, so that the water may be regarded as consisting of a series of layers bounded by thermometric limits, which are substantially permanent, and are biological strata as well. At the surface, however, temperature varies with latitude, with seasons, and with circumstances, especially under the influence of winds and currents — those rivers that flow «on the face of the deep,» here warm, there cold, each one fostering and carrying far the kinds of life agreeable to it.

A fourth factor conditioning deep-sea life is that of light, which penetrates to a distance only recently understood; but the rays at the blue end of the spectrum go much further than do the red rays — a fact of considerable biological significance. The result of late trials with the best photographic plates show that the blue rays at least penetrate to a depth of about 800 fathoms. Below that is absolute darkness, illumined only by the phosphorescent glow of the lanterns carried by animals living in those Stygian depths.

Such in broad outline are the physical conditions of plant and animal life in midocean; and there is good reason to believe that they have changed little since the beginning of earthly time.

Oceanic Plants the Basis of Subsistence. — Now how do organic beings maintain life in the world of sea water? What do they get to eat? Well, here, as elsewhere, the larger and more advanced feed on the weaker; and at the base of the list, as on land, are plants. Leaving aside the vexed question of origin, investigation has shown that not only near shore, but all over the ocean, plants exist in myriads. Most of them are lowly algæ invisible to the unaided eye, yet of vast variety in form, degree of organization and nutritive value. They find their nourishment dissolved in the sea-water and distributed uniformly around them, hence they abound everywhere within the «photic zone,» or surface-layer penetrated by sunlight; and at certain times and places they may be so plentiful as to give the water a tinge of color.

The majority are single-celled, silicious-framed diatoms. As they are heavier than the water all would sink were it not that some have means of propulsion, others parachute-like suspension-organs. They may have bladder-like attachments, or be flattened into twisted ribbons, or drawn out like a hair, or be furnished with long projections (flagellæ). Still more remarkable suspension-organs and varieties of form belong to the *Peridinæ*, which are more complicated, mobile algæ often highly phosphorescent. A third series of pelagic algæ are the brown flagellates, which possess calcareous frames forming globules called cocoliths and other shapes. Microscopic «brown algæ» occupy the most important place in the economy of the sea, and their shields of lime may be met with in geological deposits as far back as the Cambrian, practically identical with those of the present day.

Masses of seaweed are found floating in various parts of the ocean. These have been uprooted from their fastenings on shore, and collect in quiet, eddy-like places. The greatest and most permanent collection is that of the Sargasso Sea, in the Atlantic just north of the equator, where the plant *Sargassum* predominates. These continue to live and grow, but do not propagate. Such floating rafts of seaweed are the home and hiding place of a great variety of marine animals.

These algæ and seaweeds form the basis of food-supply for the whole of the marine animal-life, since those creatures that feed upon them directly are themselves the prey of all the rest, from shore to shore, from the surface to the depths and from animalcules to whales.

Character of Plankton.— Associated with the almost invisible plants swarming in the surface-layers of the ocean, is an assemblage of animals, varying from single-celled globules of protoplasm (*Protozoa*) to all the higher classes of invertebrates. These together constitute the «plankton,» the swimming or floating sea-life, and its zone is regarded as about 100 fathoms thick. It is far more populous near most shores than in mid-sea, and in warm than in colder waters, and varies in density of life according to season, temperature, and other regional conditions, yet is everywhere present. Efforts have been made to estimate the amount of plankton, as that might help to determine the amount of fish-food present, but with little success.

In this plankton are multitudes of minute protozoans (q.v.), principally foraminifers and radiolarians in a profusion of species. They have shells consisting either of lime or of silica, and it is these shells, raining down upon the bottom, that constitute the globigerina and other oozes. Here, too, float a great variety of salpæ, jellyfish and other cœlenterates and their larvæ, and many swimming worms, notably the wide-spread sagittas. Outnumbering all these, except the Protozoa, are the oceanic crustaceans, which, in countless forms and multitudes, play there, as Hæckel remarks, a part corresponding to the insects on land. Most numerous of these are the copepods, all very small; and they are the chief consumers of the minute plants, and, in turn, are among the most important food-supplies for larger creatures. Almost equally numerous are the ostracods and other crustaceans, including some big crabs.

Mollusks are fewer, for these as a rule are bottom-dwellers; but one group, the delicate, winged pteropods, are so extraordinarily numerous, that their glossy shells characterize large patches of ooze in the tropics. One species is called «whale's food,» and actually is the principal subsistence of the northern whalebone whales. A large variety of small squids is also to be found at or near the surface of the open ocean.

The pelagic plankton, which is very largely different from that of coastal regions, is augmented in summer by an extensive variety and amount of larvæ and young animals born both there and in the deeper layers; and at night many animals rise to the surface that are never caught there in daytime. Finally, it is the abode of innumerable fishes that seek their prey at or near the surface. Among these the family Scopelidæ, although represented also in the abyssal fauna, play a more important part at the surface than all other fishes combined; yet most of them are only a fraction of an inch long. Transparency and colorlessness (or a blue tint) are characteristic (for safety) of all the lesser creatures in this surface-fauna.

Intermediate Depth-Zones.— It has been said already that between the surface and the bottom the sea seems to be divided into layers or strata in respect to its inhabitants, certain kinds of animals when adult dwelling only within certain limits of depth. These intermediate zones, and their occupants are called «bathypelagic»— a term including the facts of both their undersea and deep-water existence. Practically, however, these intermediate zones can hardly be defined, and seem to be determined by limits of temperature or of osmotic pressure, and thus vary in their distance below the surface according to the general warmth and density of various regions. Animals taken only by deep hauls of the nets within the tropics, for instance, may be found near the surface in cooler latitudes; furthermore the vertical distribution of fishes, as a class, may differ from that of crustaceans or other groups as a class. Nevertheless it is generally true that many sorts of pelagic animals dwell at intermediate depths, from which, when adult, they cannot either rise or descend to any great distance. Space cannot be given to much evidence of this, but the following extract from the report of the «Michael Sars Expedition» (1910) gives the following general results of its dredgings and net-haulings, as bearing on this point, as follows:

«These catches may be classified into three main regions: (1) A region extending downward from about 500 metres, characterized by the recurrence of *Cyclothone* and various black or dark-colored fishes, and of many peculiar invertebrates, red prawns being prominent; (2) a region ranging between 150 and 500 metres, characterized by a peculiar community of silvery or grayish fishes belonging to the families *Sternoptychidæ* and *Stomiatidæ;* and (3) the surface region, comprising the upper 150 metres. . . . The layer from 800 to 1,000 metres downward may require to be still further subdivided, for certain forms, like the larger *Acanthophyra* with red eggs, *Notostomus,* and several fishes and squids have been taken only in the deepest hauls at 1,500 or 2,000 metres.»

Abyssal Life.— Let us now consider the creatures of the abyssal depths, where eternal cold, stillness, darkness and equability unite to make an environment so forbidding that the imagination would refuse to people it with living beings, yet where life and strife do actually abound. This bottom fauna, however, is not equally distributed. It is far more scanty on the areas of red clay than on the ooze; and the faunæ of the various ocean-beds differ, because barrier ridges separate them. What is said here relates to that of the bed of the deep Atlantic, which is better known than any other.

The real bottom-animals are mainly fixed, and consist of sponges, hydroids, actinians, bryozoans, ophiurans, crinoids, brachiopods, holothurians, worms and mollusks. These are nowhere numerous, and below 2,500 fathoms are very scarce, to judge by the results of dredging. Their subsistence is wholly derived, apparently, from the surface, some catching it as it falls and others sucking it out of the top layer of the ooze. Moving about there also is a limited population of snails, crabs, squids and fishes, making their living upon or close to the bottom; and a larger and more varied company of their relatives swim in the water above them, up to, say, the 2,000-fathom line. All are of forms different in many respects from related species at or near the surface, and some brought up by the dredge can hardly be distinguished from fossils entombed in the oldest fossiliferous rocks, so unchangeable is the environment in which their race has been propagated for perhaps 50,000,000 years.

Through these black abysses swim fishes with extraordinary adaptations to their conditions. No attempt at even brief descriptions would be worth making. All are small, often less than an inch, rarely as much as six inches long, yet they are armed to the teeth. This is especially true of the families *Stomiatidæ* and *Sternoptychidæ,* in which fishes of grotesque shape have big heads with a savage array of long sharp teeth.

DEER (Cervidae)

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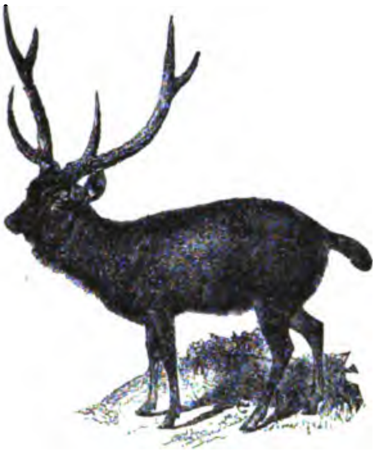

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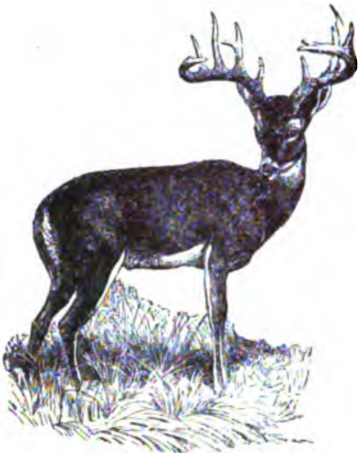

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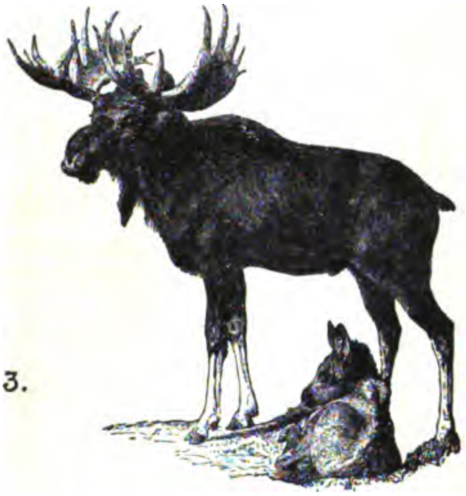

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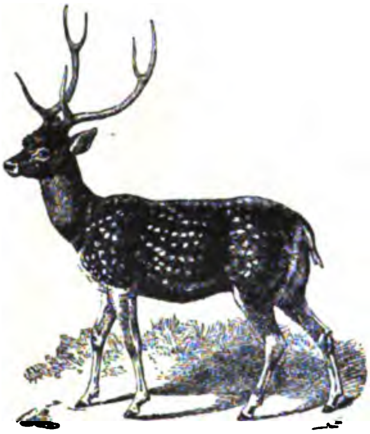

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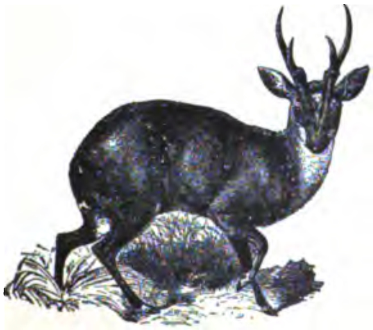

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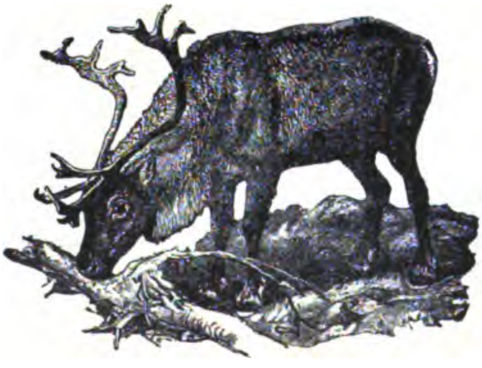

1 The Sambur (Cervus Aristotelis)
2 The Virginia Deer (Cariacus virginianus)
3 The Elk (Alces palmatus)
4 The Axis (Cervus axis)
5 The Muntjac (Cervulus muntjac)
6 The Reindeer (Rangifer tarandus)

All are voracious, and some, as *Chiasmodus,* have mouths so capacious and stomachs so distensible that they can often swallow fishes as large as themselves, when their stretched stomach with its load hangs beneath them like the yolk-sac of a newly-born trout. All are dark in color, brown, blue or violet marking the abyssal species. Some of them have light-giving organs; and this was formerly regarded as a peculiar possession of deep-sea fishes, enabling them to see their prey in the Stygian gloom of the sunless abyss; but it is now known that light-organs are especially characteristic of pelagic fishes of the region between the surface and 250 fathoms of depth; and ichthyologists are uncertain what service they are to the fishes that carry them.

The eyes of most fishes, such as *Macrurus armatus,* that inhabit the deepest bottom-layers are very large and have the quality of nocturnal eyes generally — are «day-blind»; yet many fishes, squids, etc., hauled from great depths, have no visible eyes at all, or small and nearly useless ones; and this puzzling contradiction applies to other fishes living at intermediate depths. Some of the blind abyssal fishes are provided with whiplike fin-rays or very long head-filaments that probably act as «feelers,» and so serve the purpose of eyes in seeking food or taking warning of danger.

The general deductions to be made from this outline are that the waters of the ocean are everywhere inhabited, even to their uttermost depths, by living beings; and these are adapted to various circumstances and so form faunas of local extent and character.

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ERNEST INGERSOLL.

DEER, animals of the family *Cervidæ* (q.v.), which are noted for their grace of structure and their fleetnesss of motion. Since the earliest times they have been known as objects of the chase, and their meat, «venison,» is considered a delicacy. The male deer is usually called «buck,» but the male red deer of Europe is a «stag,» or when mature a «hart.» The female is called a «hind,» or «doe.» In the language of mediæval venery each kind of deer, and each age of growing buck, has a distinctive name.

All deer have a coat of short fur, dull in tone, ranging from reddish-brown to gray on the upper surfaces, and usually white below. Those that are marked bear such markings on the face and throat and on the tail. Only a few genera are spotted. In most genera only the young (the fawns) are spotted, and lose their spots when they are about one year old. Deer breed annually, the young, one or two at a birth, being produced in late spring. The fawns remain with their mothers until they are about a year old, when they are sufficiently mature to become independent. The grass-land deer, especially, are gregarious, and often gather in large herds at the approach of winter. These feed on the meadow herbage, whereas the forest deer eat the leaves, twigs, and buds of bushes.

The deer is valued not only as food (it is the main subsistence of some northern tribes), but for commercial purposes. The skins make a peculiarly strong, soft leather, known as buckskin; skins with the fur on are not of much account, as the hair is brittle and soon disappears. The hoofs and horns are prized for ornamental purposes, especially the antlers of the roe-deer, which are utilized for making umbrella-handles, and for similar purposes; and the elk-horn, often employed in making knife-handles. The Chinese also make a medicine from stag-horn and they eat the antlers of certain species when «in the velvet.» The reindeer is as valuable to the people of the frozen North as the camel is to the desert traveler. The Indians of the region north of Hudson Bay and Great Slave Lake are almost wholly dependent on the caribou.

Deer have long been bred in captivity as ornaments for parks, but only in the case of reindeer has thorough domestication succeeded. Considerable attention is being paid in those parts of the United States where large tracts of wild land are available to breeding the American deer for market and this will doubtless become in the future an important source of meat supply.

The deer family is older than other families of ruminants, dating back to the Lower Miocene Period, when they were very small and without antlers. With a gradual structural change in other directions, such as variations in dentition and increased size, the antlers have been produced and amplified, so that the deer of the present is a far larger and finer-looking animal than his fossil ancestor. In the matter of antlers the young stag typifies the evolution of the race; as a yearling, his antlers are merely one-pronged spikes; but each successive year they become more branched and forked until at maturity they may have seven or more branches. See articles under various English names of deer, as ELK; FALLOW DEER; MOOSE, etc. Consult Lydekker, ‘Deer of All Lands’ (London 1898); Roosevelt (and others), ‘The Deer Family’ (New York 1902); Ingersoll, ‘Life of Mammals’ (New York 1907).

DEER FORESTS, large tracts of waste or uncultivated and mostly uncultivable land, chiefly situated in the Highlands of Scotland, set apart as grounds in which the stag or red-deer is hunted for sport, but is otherwise protected and allowed to roam in its natural wild state. The name forest does not in this case imply the existence of trees. As a matter of fact most deer forests are mountains or high-lying stretches of ground, exhibiting large areas covered with heath, in many places peat-bogs, marshes, lochs or bare rock, elsewhere patches of grass or other herbage, while plantations of trees of greater or less extent may also occur. Some of the deer forests are of very great extent, the larger covering, say, from 50,000 to 70,000 acres. The counties in which they are chiefly situated are Sutherland, Ross, Cromarty, Inverness, and Argyle, while they also exist in Aberdeen, Banff, Forfar, Perth and Caithness. A number of them are retained in the hands of their proprietors, while many others are let, either for the shooting season or [illegible] lovely [illegible] name of the [illegible]

[illegible] (Peromyscus [illegible]), the [illegible] North America, [illegible] color [illegible] along [illegible] being [illegible] rounded [illegible] and [illegible] little [illegible] all cheek- [illegible] four inches, [illegible] different sec- [illegible] habits are [illegible] human [illegible] the jumping [illegible]

DEER-STALKING, a [illegible] but labori- [illegible] the [illegible] in which, on [illegible] slopes of the game, [illegible] and keen sense of smell, [illegible] approached by cautious manœu- [illegible] a chance of obtaining a shot oc- [illegible] Great patience and tact and a thorough knowledge of the ground are essential to a [illegible] stalker, who has to undergo many dis- [illegible] in crouching, creeping and wading [illegible] etc. Advance from higher to [illegible] is usually made, since the deer [illegible] to look to the low ground as the source of danger. "Deer-driving," toward a point where the shooters are concealed is often practised, but is regarded as poor sport by the [illegible] deerstalker.

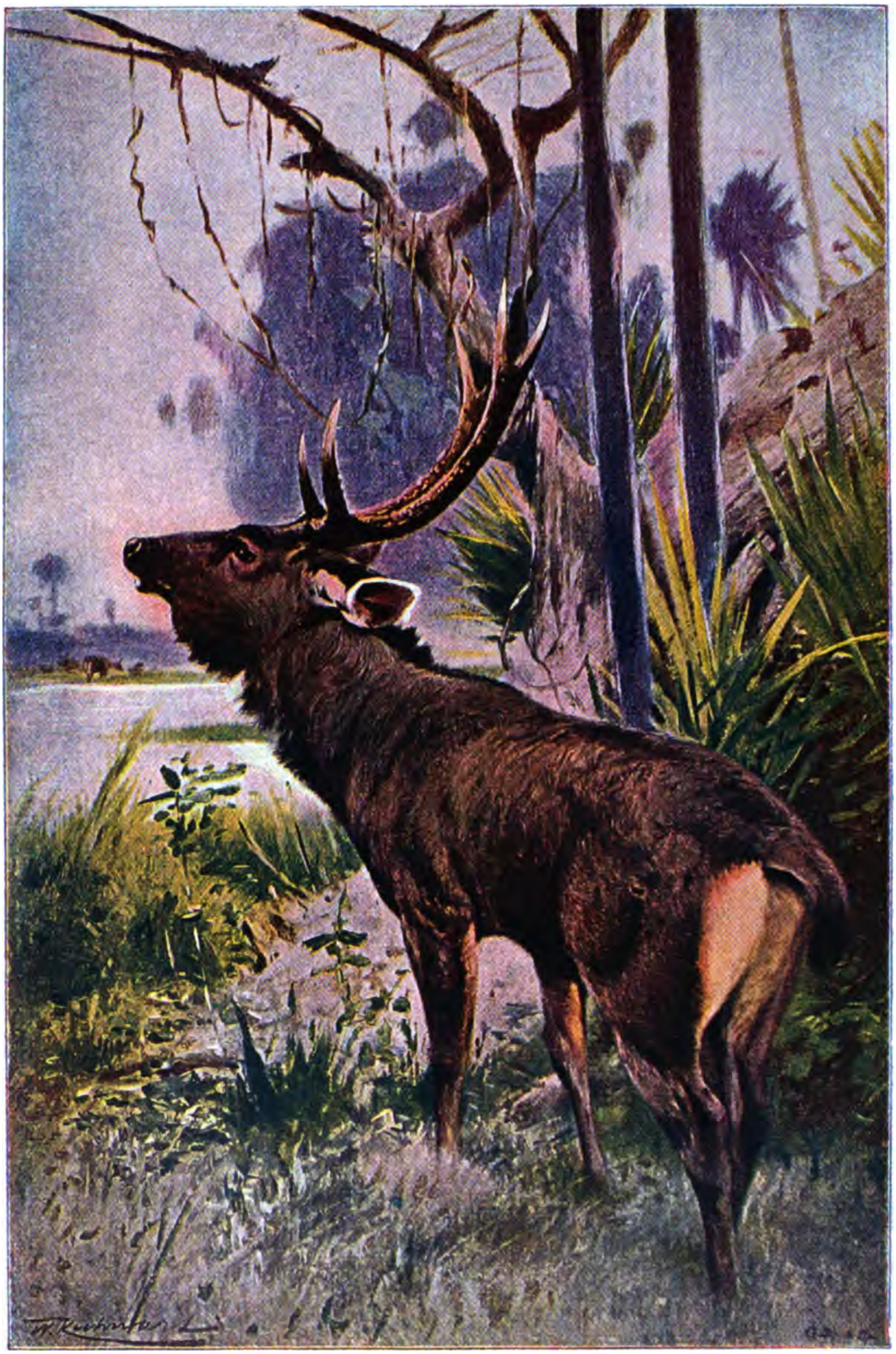
DEERFIELD, Mass., town of Franklin County, on the Connecticut River and the Boston and Maine and the New York, New Haven and Hartford railroads, 33 miles north of Springfield. It is an agricultural region, and its industries are closely related to agricultural products. It has also manufactures of pocket books and art novelties. [illegible] has a high school, Deerfield Academy and a public library. The town contains [illegible] South Deerfield, and in colonial times [illegible] scene of several contests with the In[illegible] them were the "Bloody Brook Massacre" ([illegible]) and the burning of the village [illegible] French and Indians under De Rouville [illegible] Old Deerfield has a beautiful soldiers' monument, and there is a [illegible] marble monument [illegible] Bloody Brook disaster. [illegible] teacher, [illegible] works [illegible] The government is [illegible] town meetings. Pop. 2,2[illegible] Consult Sheldon, 'A History of Deerfield, Mass.' [illegible] and Powell, 'Historic Towns of New England' (New York 1[illegible]

DEERFIELD RIVER, a river in Massachusetts, rising in southern Vermont and [illegible] southeast for 60 miles [illegible] enters the Connecticut River. The [illegible] of nearly 1,300 feet in 50 miles [illegible] water power at many places, [illegible] at the Hoosac Tunnel and [illegible] burne Falls. Several streams nearly as [illegible] as the main river enter it from the north.

DEERFOOT, famous runner: b. Cattaraugus reservation, Buffalo, 1828; d. there [illegible] A half-breed Seneca Indian, he [illegible] taken to England in 1861 and matched against the best long distance runners, defeating [illegible] He lost a six-mile race [illegible] Mills in September 1861, but defeated White in a four-mile contest a few days later, [illegible] after on both of those experts in [illegible] mile championship. He beat Lovett and [illegible] (12 miles) at Dublin for $500 [illegible] and Hewitt — the 'American Deer,' [illegible] (four miles). He made a record of [illegible] miles 720 yards in one hour (London, Oct. 1862), and 11½ miles in one hour [illegible] seconds February 1863); and other records [illegible] miles and 12 miles in 57 minutes and 62 minutes respectively.

DEERHOUND, the Scottish greyhound used for deer hunting. See Dog.

DEERSLAYER, The. 'The Deerslayer,' last of the Leather-Stocking tales, which [illegible] Cooper published in 184[illegible], is first in order of events narrated in that famous se[illegible] The actions take place on and about O[illegible] Lake between 1740 and 1745. According to Cooper's own words, the "legend is purely fic- tion, no authority existing for any of its [illegible] characters, or other peculiarities," but "the de- scriptions of scenery in the tale are reas[illegible] accurate." Essentially a romance, full of dewy freshness, with large, bland, [illegible] landscapes, and full of the forest philosophy which underlies the whole of Cooper's con- ception of Leather-Stocking, the book is at the same time, like all his later novels, consider[illegible] realistic. The dialect is careful, the [illegible] craft generally sound. The reality of the [illegible] however, comes chiefly from the reasoned [illegible] sentation of the central issue: the conflict in Leather-Stocking between the forces [illegible] draw him to the woods and those which seem to attach him to his human kind. The same [illegible] flict had figured in earlier volumes of the se[illegible] but here it is more appealing than ever [illegible] because the hero is in the warm morning of youth and must choose his career even against the enticements of love. It is hard to [illegible] whether it is at the prescription of romance or at the demand of realism that he choose[illegible] native forests; he is enough a romantic [illegible] ace to prefer the wilderness, and yet his [illegible] is not a romantic victory but a victory real[illegible] cally in keeping with his total character. [illegible] helps him to his choice is that Judith H[illegible]



SAMBUR *(Cervus Unicolor)*

for a period of years, and in this case may bring a large rental to their owners. The annual rental value of the larger deer forests ranges from $5,000 to $20,000 or even more, and the total rental of the deer forests of Scotland has been set down at over $1,000,000 per annum. Every stag killed costs the person who rents the ground about 50 guineas. A deer forest is always an expensive affair, not only for the rent that has to be paid, but also for the number of keepers, gillies, watchers, beaters, etc., that have to be employed in connection with it.

DEER-GRASS (*Rhexia virginica*), one of the American representatives of the large family of plants called *Melastomaceæ*, meadow-beauty family, of which only about 20 species are found in the United States. The deer-grass extends from Maine to Florida and west to Illinois, Missouri and Louisiana. Other species extend the habitat of the genus to Texas. The flowers are conspicuous and showy, with bright rosy purple petals, and render the meadows unusually gay when adorned with patches of this lovely plant, entitling it to the common name of the meadow-beauty.

DEER-MOUSE (*Peromyscus leucopus*), the common white-footed mouse of North America, a rodent of the family *Muridæ*. The main color of its body is buff or fawn, growing dark along the back, the feet and under parts being snowy white. With full, bright eyes, high, rounded ears, long whiskers and tail, graceful and sprightly movement, it is a very attractive little animal. It has been found to have small cheek-pouches. Its length rarely exceeds four inches, its tail being nearly as long. In different sections of the country its markings and habits are varied, and in some it seeks a home in the human dwelling, as do other mice. Also the jumping mouse, *Zapus hudsonius.*

DEER-STALKING, an exciting but laborious mode of hunting the red-deer, in which, on account of the extreme shyness of the game, their far-sightedness and keen sense of smell, they have to be approached by cautious manœuvring before a chance of obtaining a shot occurs. Great patience and tact and a thorough knowledge of the ground are essential to a good stalker, who has to undergo many discomforts in crouching, creeping and wading through bogs, etc. Advance from higher to lower ground is usually made, since the deer are always apt to look to the low ground as the source of danger. «Deer-driving» toward a point where the shooters are concealed is often practised, but is regarded as poor sport by the true deer-stalker.

DEERFIELD, Mass., town of Franklin County, on the Connecticut River and the Boston and Maine and the New York, New Haven and Hartford railroads, 33 miles north of Springfield. It is an agricultural region, and its industries are chiefly related to agricultural products. It has also manufactures of pocket books and art novelties. It has a high school, Deerfield Academy and a public library. The town contains the village of South Deerfield, and in colonial times was the scene of several contests with the Indians. Among them were the «Bloody Brook Massacre» (1675) and the burning of the village by the French and Indians under De Rouville (1703). Old Deerfield has a beautiful soldiers' monument, and there is at South Deerfield a marble monument commemorative of the Bloody Brook disaster. Eliza Allen Starr, author and art teacher, was born in Deerfield. The waterworks are owned by the municipality. The government is administered by annual town meetings. Pop. 2,209. Consult Sheldon, ‹A History of Deerfield, Mass.› (Deerfield 1895–96), and Powell, ‹Historic Towns of New England› (New York 1898).

DEERFIELD RIVER, a river in Massachusetts, rising in southern Vermont and flowing generally southeast for 60 miles, when it enters the Connecticut River. The great fall of the river of nearly 1,100 feet in 50 miles furnishes water power at many places, of which the chief are at the Hoosac Tunnel and Shelburne Falls. Several streams nearly as large as the main river enter it from the north.

DEERFOOT, famous runner: b. Cattaraugus reservation, Buffalo, 1828; d. there, 18 Jan. 1897. A half-breed Seneca Indian, he was taken to England in 1861 and matched against the best long-distance runners, defeating nearly all of them. He lost a six-mile race against Mills in September 1861, but defeated White in a four-mile contest a few days later, and directly after outran both of those experts in a 10-mile championship. He beat Levett and Mills (12 miles) at Dublin for $500 in 65 minutes, and Howitt — the «American Deer,» in London (four miles). He made a record of 11 miles 720 yards in one hour (London, October 1862), and 11½ miles in one hour less six seconds February 1863); another record was 11 miles and 12 miles in 57 minutes and 62 minutes respectively.

DEERHOUND, the Scottish greyhound used for deer-hunting. See Dog.

DEERSLAYER, The. ‹The Deerslayer,› last of the Leather-Stocking tales, which Fenimore Cooper published in 1841, is first in the order of events narrated in that famous series. The actions take place on and about Otsego Lake between 1740 and 1745. According to Cooper's own words, the «legend is purely fiction, no authority existing for any of its facts, characters, or other peculiarities,» but «the descriptions of scenery in the tale are reasonably accurate.» Essentially a romance, full of a dewy freshness, with large, bland, eloquent landscapes, and full of the forest philosophy which underlies the whole of Cooper's conception of Leather-Stocking, the book is at the same time, like all his later novels, considerably realistic. The dialect is careful, the woodcraft generally sound. The reality of the piece, however, comes chiefly from the reasoned presentation of the central issue: the conflict in Leather-Stocking between the forces which draw him to the woods and those which seek to attach him to his human kind. The same conflict had figured in earlier volumes of the series, but here it is more appealing than ever before because the hero is in the warm morning of his youth and must choose his career even against the enticements of love. It is hard to tell whether it is at the prescription of romance or at the demand of realism that he chooses his native forests; he is enough a romantic personage to prefer the wilderness, and yet his victory is not a romantic victory but a victory realistically in keeping with his total character. What helps him to his choice is that Judith Hutter,

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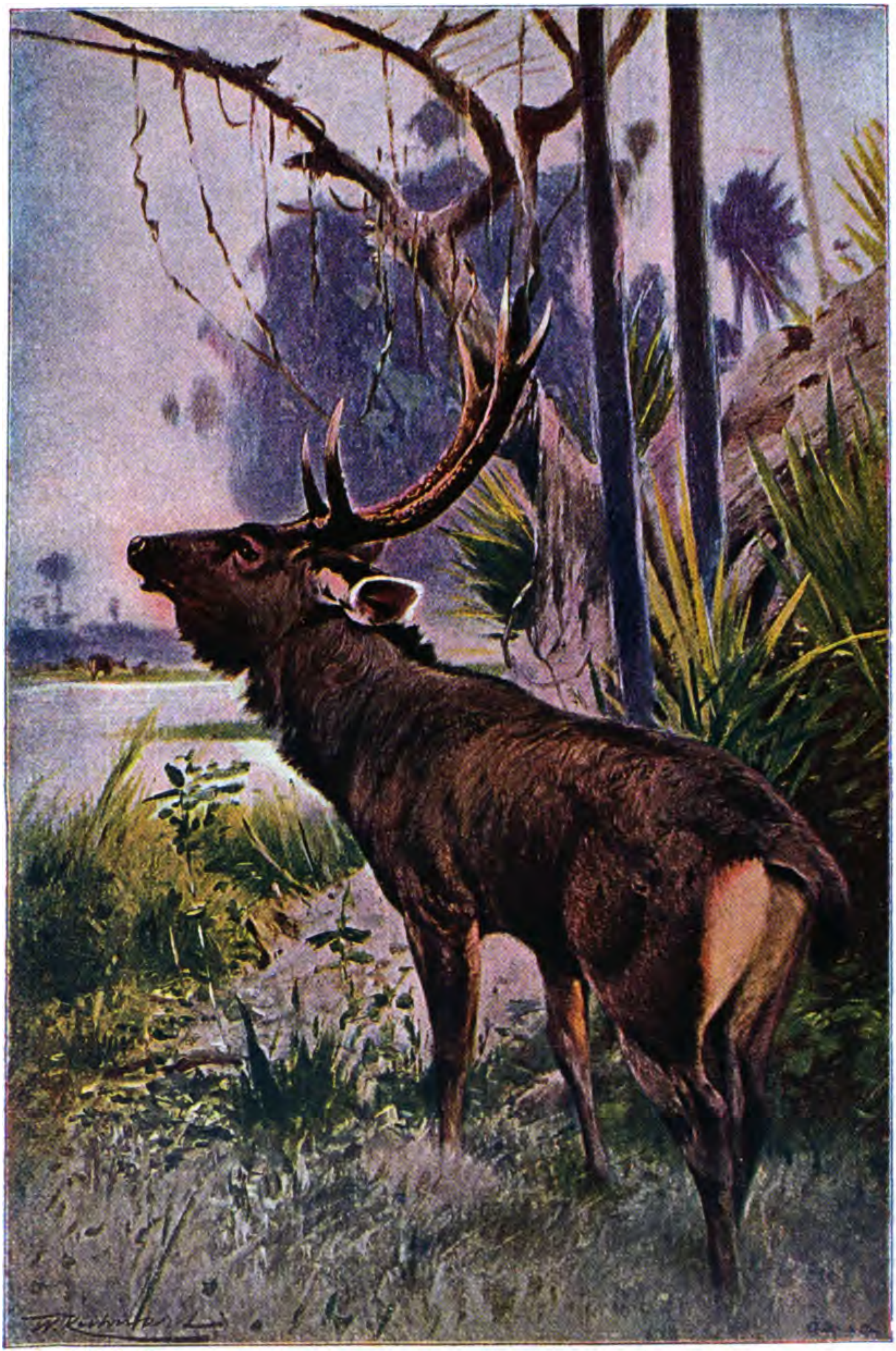

SAMBUR (*Cervus Unicolor*)

who loves him, one of the few convincing young women in Cooper's works, has been corrupted by the settlements, and to turn from her is an act forced by his simple principles of virtue as well as suggested by his preferences for a life in nature. 'The Deerslayer' is thus the tale of his coming age. Already a hunter, as his name implies, he kills his first man. His distress at the realization seems immeasurably eloquent to readers who, knowing his future from the other Leather-Stocking stories, remember the many deaths Natty has yet to deal. In other matters he is near his later self, for he starts life with a steady philosophy which, through all the many experiences of the volume, keeps him to the end as simple and honorable as at the outset. Of the minor characters only the ardent young Chingachgook and the silly Hetty Hutter call for mention. The movement is rapid, the incidents varied, and the piece as a whole absorbing.

Carl Van Doren.

DE FACTO. The word *de facto* means «actual, in fact, based on fact,» in contradistinction to *de jure*, which means «based on law, by right, by lawful title.» A *de facto* government is always a usurpation and may be said to exist when the usurping government has expelled the regularly constituted authorities from their customary seats and functions and has established itself in their place, so becoming the actual government of a country. Such was the government of England under the Commonwealth. Such government continues to be a usurpation as long as it is in power or until legalized by the recognition of the department entrusted with the authority to recognize the existence of a state; but the authority claimed for a *de facto* government must be effective and actually in operation before it may assume the *de facto* character. The United States Supreme Court has said: «Who is the sovereign de jure or de facto of a territory is not a judicial but a political question the determination of which by the legislative and executive departments of any government conclusively binds the judges, as well as other officers, citizens and subjects of that government. This principle has always been upheld by this court and has been affirmed under a great variety of circumstances. It is equally well settled in England.» The Confederacy of 1861-65 in the United States was a *de facto* government and its actual exercise of authority over a given territory gained for it a certain amount of foreign recognition (see Secession; Confederate States of America; United States — Secession, etc.), but in point of law, since the Confederates did not gain independence and could not establish a government *de jure*, the usurpation remained illegal to the end. On the other hand, the Continental Congress exercised *de facto* authority which became *de jure* when Great Britain recognized the independence of the colonies. Thus their success gained for the colonies legal sanction of their usurping acts. A government may be *de facto* also when by paramount force it maintains itself by military power despite the regularly constituted authorities and is able to compel the obedience of private citizens. A *de facto* authority may usurp and exercise the authority of any public office, legislative, executive or judicial, but the mere usurpation of the office does not constitute the usurper a *de facto* officer unless he actually exercises the functions of the office. Thus when President Johnson removed Secretary of War Stanton (q.v.) on 21 Feb. 1868 and appointed Lorenzo Thomas Secretary *ad interim*, Stanton's refusal either to resign, to relinquish the office, or to allow another to exercise the functions of Secretary really constituted him a usurper in spite of the Tenure-of-Office Act (partially repealed in 1869 and wholly in 1887), and his actual exercise of authority, backed by Congress, made him the *de facto* Secretary. The failure of Congress to sustain Stanton by removing Johnson prevented Stanton again becoming Secretary *de jure* which he had been prior to his removal by Johnson. (Consult Dunning, William A., 'Reconstruction, Political and Economic,' pp. 90-92, 99-108, New York 1907). Acts performed under the authority of a *de facto* government are valid if such government by legal process subsequently become the government *de jure*, and certain acts of a *de facto* government which does not become *de jure* may be valid, e.g., if the regular taxes for administrative purposes be paid by a private citizen to the *de facto* authorities, he may not be forced to pay such taxes a second time. As far as other nations are concerned such a government is treated as in most respects possessing rightful authority; its contracts and treaties are usually enforced; its acquisitions are retained; its legislation is in general recognized; and the rights acquired under it are, with few exceptions, respected after the restoration of the authorities which were expelled (96 U. S. 176, 185-86). For decisions consult Thorington *v.* Smith, 8 Wallace 1; Williams *v.* Bruffy, 96 U. S. Sup. Ct. 176; Jones *v.* U. S., 137 U. S. 202. See Government; State; International Law.

DE FACTO CORPORATIONS. See Corporations, Legal.

DEFAMATION, the speaking or writing words of a person so as to hurt his good fame. Written defamation is termed libel, and oral defamation slander. See Libel; Slander.

DEFAULT, a failure to appear in any court on the day assigned; especially applied to a defendant when he fails or neglects to plead or put in his answer on an appointed day. In such cases the plaintiff is entitled to sign judgment against him, which is called judgment by default, and the defendant is said to suffer judgment by default. Failure to perform an obligation is termed a default.

DEFAUX, dė-fō', **Alexandre,** French landscape painter: b. Bercy, near Paris, 27 Sept. 1826. He was a pupil of Corot and his paintings are distinguished by a remarkable understanding of perspective. He began to exhibit in the Paris Salon in 1859 and among his numerous landscapes are 'View at Caen'; 'Abandoned Race Course at Ivry'; 'View of Saint Maur, Coast of Gravelle' (1863); 'Evening in Spring' (1869); 'Fine Winter Day in Bas Meudon' (1873); 'The Loire after a Flood' (1873); 'Birches at Fontainebleau' (1874); 'Gravel Pit at Fontainebleau' (1877); 'Forest of Fontainebleau' (1879); 'Harbor of Pont-Aven' (1880); 'Old Birch-trees at Pigeon Pond in Fontainebleau'; 'Low Tide in Normandy' (1884); 'Pastime of a Flock of Geese'; 'After the Storm' (1885).

DEFEASANCE, in law, an instrument which defeats the force or operation of some other deed or estate. That which is in the same deed is called a condition; and that which is in a separate deed is called a defeasance. The defeasance may be subsequent to the deed in case of things executory, but must be part of the same transaction in case of an executed contract. Yet where an instrument of defeasance is executed subsequently in pursuance of an agreement made at the time of making the original deed, it is sufficient; as well as where a deed and a defeasance bear different dates but are delivered at the same time. The instrument of defeasance must at law be of as high a nature as the principal deed. It must recite the deed it relates to, or at least the most material part thereof; and it is to be made between the same persons that were parties to the first deed. Defeasances of deeds conveying real estate are generally subject to the same rules as deeds, as to record and notice to purchasers, but in some cases, notice is not sufficient without recording.

DEFECTIVES. See FEEBLE MINDED.

DEFENDANT, in law, the party against whom a complaint, demand or charge is brought, in a civil or criminal proceeding; one who is summoned into court and defends, denies or opposes the demand or charge and maintains his own right. The term is applied even if the party admits the claim.

DEFENDER OF THE FAITH (*defensor fidei*), the title bestowed on Henry VIII of England by Pope Leo X (1521) in recognition of the monarch's great service to the Roman Catholic Church in writing his *Assertio Septem Sacramentorum adversus Martinum Lutherum* (vindication of the seven sacraments against Martin Luther). Pallavicini, in his history of the Council of Trent, describes the great satisfaction given to the papal court by King Henry's book and the modes suggested by various cardinals of acknowledging the obligation to the monarch. The Pope, with the aid of his secretary Sadolet, had a form of bull drawn up conferring on Henry the title «Defender of the Faith,» so that he might be on a par in the matter of titles relating to religion with the king of Spain's «Catholic majesty» and the king of France's «most Christian majesty.» At the suppression of the religious houses at the Reformation the Pope recalled the title. In 1544 it was reconfirmed by Parliament and has remained ever since.

DEFENDER OF THE MARRIAGE TIE, Defensor Matrimonii, or Defensor Vinculi Matrimonialis, an official in every episcopal jurisdiction of the Roman Catholic Church, whose duty it is in all cases of petitions or suits for judicial separation of married couples or for annulment on whatever ground of marriage contracts or of the marriage relation, to defend with all his power the validity of the contract and resist its abrogation. The Defensor is required to be in person present at every stage of the trial of a matrimonial cause, and he must have access to all the records and all the testimony. Not only may he, in case the court decides for the nullity of the marriage, appeal to a court of second instance; he is under obligation to appeal every single case; and if he demands it, he must be allowed a further appeal to the highest court. Nor is that all; he has the right, and it is his duty, to open the case anew if he finds there was any serious flaw in the judgment of nullity. In short, a matrimonial cause involving nullity of a consummated marriage contract is in the Catholic Church never finally and absolutely determined so long as either of the two parties to the suit is living. Consult Taunton, 'The Law of the Church' (London 1906).

DEFENDERS, a Roman Catholic association in Ireland (1784–98), the opponents of the Peep o' Day Boys.

DEFENSE, (1) the answer, denial, or plea of the defendant to the plaintiff's or prosecutor's case. By common law, the defense was merely an answer to the plaintiff's cause of action, being thus the second step in the proceeding. It did not include the demurrer, but in England and in the United States generally the defense includes the demurrer. Although common-law pleading is followed in many States in this country, the term defense has been extended generally to include the plea as well as the demurrer. Under the reformed procedure the term defense may be properly applied to the answer of the respondent to a bill in equity of the complainant, although formerly this was not the case, the term being applied exclusively to common-law actions. It is used both in civil and in criminal suits. The defense must contain every material fact relied upon by the defendant at the trial to defeat the plaintiff's cause of action, and every statement of claim made by the plaintiff must be admitted or denied, although other facts may be pleaded. A statement of defense must generally be delivered to the plaintiff or his attorney within a limited time, varying often with the jurisdiction.

DEFENSE OF POESIE, The. The title given to Sir Philip Sidney's 'Apologie for Poesie' when printed for the second time in the third edition of the 'Arcadia' in 1598.

DEFENSE OF THE REALM ACT. An emergency measure passed by the British Parliament 7 August on the outbreak of the European War in 1914, authorizing the trial during the war by court-martial of persons contravening regulations designed (a) to prevent communication of information to the enemy which might be useful, and (b) to secure the safety of railways, docks and harbors. A second act of similar title somewhat strengthened its provisions. Power was also given to detain actual or suspected spies; by the Restriction of Aliens Bill all alien enemies were required to register themselves with the police and were prohibited from traveling more than five miles from their registered address without permission.

DEFFAND, dĕf-făṅ, **Marie de Vichy-Chamrond,** MARQUISE DU, French letter writer: b. Château de Chamrond, France, 1697; d. Paris 24 Sept 1780. In 1718 she married the Marquis du Deffand, from whom she separated after 10 years. During the latter part of her long life she became the centre of a literary coterie, which included some of the greatest geniuses of the age. Among women remarkable for their wit and talents in the 18th century Madame du Deffand claims a distinguished place, though she left no monument of her abilities except her epistolary correspondence, highly praised by D'Alembert as affording a model of style in that species of composition. During the last 30 years of her life she was blind. In 1810 was published 'Correspondence inédite de Madame du Deffand, avec D'Alembert, Montesquieu, le Président Hénault, la Duchesse du Maine; Mesdames de Choiseul, de Staël; le Marquis d'Argens, le Chevalier d'Aydie, etc.' Her letters to the celebrated Horace Walpole, for whom she conceived a violent passion, have likewise been printed. Consult Sainte-Beuve, 'Causeries du Lundi' (Vols. I, XIV).

DEFIANCE, Ohio, city, county-seat of Defiance County; on the Maumee River near the tributary mouth of the Tiffin and Auglaize rivers, and on the Cincinnati and Toledo Canal, 50 miles southwest of Toledo. The Baltimore and Ohio, the Wabash railroads and the Ohio Electric railroad to Lima, 42 miles distant, afford transit facilities for the farming products and live stock of the surrounding agricultural region. Defiance is a busy trading centre and its manufacturing industries include flour mills, important machine shops, steel factories, farm implements, wagon, carriage and bicycle works, and woolen mills. It is the seat of Defiance College (q.v.), and has a national bank, daily and weekly newspapers. On the site of an Indian village where General Anthony Wayne built Fort Defiance in 1794, the city dominates a fine view of river and county scenery. Defiance was platted as a town in 1822; in 1845 became the county-seat; and was incorporated as a city in 1881. Pop. 7,500.

DEFIANCE COLLEGE, a coeducational (non-sectarian) institution in Defiance, Ohio; founded in 1902. It was originally the Defiance Female Academy founded in 1850 and opened in 1885. In 1918 it reports professors and instructors, 26; students, 601; volumes in the library, 7,000. Courses are given in the general academic, music, normal and commercial departments. It is owned by the Christians, and is connected with the Christian Biblical Institute, which has a separate board of trustees under the same president.

DEFILEMENT. In many ancient religions the doctrine of ceremonial defilement was taught as is so clearly proven by J. G. Frazer in his 'Golden Bough.' Contact with a dead body, or anything tabooed was defilement. In the Hebrew religion the same idea was taught in the Levitical Code, and rules for purification stated. The Rabbinical teaching carried the observance of defilement and purification to an extreme. Elaborate and lengthy ceremonies were instituted. In the Christian religion as taught in the New Testament, the idea of defilement is purely symbolical, and relates to the defilement of the heart by sin or evil motives. In the early church the old sacrificial idea of defilement was sometimes prevalent, as in the teaching of Saint Simon Stylites and his followers. The fundamental principle of monasticism is the escape from defilement in a worldly environment. The present teaching is a return to the New Testament idea.

DEFINITION (from the Latin *definitio*) of a thing signifies, in lexicography, a concise account of its essential and characteristic points. A definition should embrace all the essential properties of the object intended to be defined, and not admit any which do not belong to it, which is often extremely difficult, on account of the shades and gradations by which different things are blended. The most simple things are the least capable of definition, from the difficulty of finding terms more simple and intelligible than the one to be defined. According to the old scholastic logic, a definition must give the mark of the genus (*nota generalis seu genus*) and of the species (*nota specialis seu differentia specifica*); for instance, a barn is a building (*nota generalis*) for the purpose of preserving corn, etc., (*nota specialis*). According to Aristotle every strict definition could be divided into two distinct parts; one dealing with the genus, and the other declaring the specific difference by which the given subject varies from others of the same order. Kant and his followers on the contrary make definition merely a list of essential marks summed up without any distinction between genus and difference.

In *optics* definition means the defining power of a lens — the giving of a clear and distinct image of an object together with all details of importance.

DEFLATION, that geologic activity of the atmosphere that is manifested in the removal of rock material by wind work, entirely aside from any mechanical wear or abrasion. It is characteristic of desert regions.

DEFLECTION OF THE PLUMB LINE, The, or the deflection of the vertical is the angular variation between the line vertical to the actual curve of the earth's surface at any given point, as determined by the varying nature of its constituents beneath, and the line normal to the theoretical curve of the earth considered as a homogeneous ellipsoid of revolution. (See ISOSTASY). Consult United States Coast and Geodetic Survey, 'Special Publications' 10 and 12 (Washington 1912).

DEFOE, Daniel, English journalist and novelist, author of 'Robinson Crusoe': b. London 1659 or 1660; d. London, 26 April 1731. He was the son of James Foe, a butcher, and was born in the parish of Saint Giles, Cripplegate. The date of his birth used to be given as 1661 from a statement in the preface of his 'Protestant Monastery' (1727), that he was then in his 67th year; but the late G. A. Aitken showed (*Athenæum*, 23 Aug. 1890) that he was born late in 1659 or early in 1660. Little is known of his early years save that he was bright and active and well grounded by his parents in the Bible and in the Presbyterian faith. At about 14 he was sent to a Dissenters' school kept at Newington Green by the Rev. Charles Morton, afterward vice-president of Harvard. Here he studied theology, the classics, some of the modern languages, mathematics, and history and geography, becoming later extraordinarily proficient in the two subjects last named. In after years Defoe, defending the school, laid special emphasis on the instruction in English composition. His school course was intended to fit him for the Presbyterian ministry, Dissenters being not then allowed at the universities; but somewhere about 1678 he came to the conclusion that the position of a Dissenting clergyman was not an enviable one and that he would do better to go into business.

Scarcely anything is known of his life for the next five years, save that he was interested in public affairs during the "Popish Plot" and that he wrote — whether he published is doubtful — in favor of Austria against the Turks. In 1683 he was established in Cornhill, probably as a "hose factor," or wholesale dry-goods merchant. On 1 Jan. 1683–84 he married Mary Tuffley, by whom he soon had several children. It appears from his writings that he made voyages to Spain and Portugal and resided in Spain for a time, but no dates are given. Probably this was before his marriage, and at this same period he may have done the traveling in Italy and elsewhere of which he makes mention. Equally obscure is his share in the Monmouth uprising, yet it seems likely that he took part in that visionary enterprise and, unlike some of his old schoolmates, escaped being brought before Jeffreys. During the short reign of James II he appears to have used his pen against the Declaration of Indulgence, but his tract or tracts cannot be identified, the 'Letter' believed by Lee to be Defoe's seeming to be Bishop Burnet's. In January 1687–88 he was enrolled in the Butcher's Company, thus becoming a liveryman of the city of London. There is also some evidence that he was a resident of suburban places and that his standing in Presbyterian and commercial circles was good.

At the close of 1688 Defoe joined the army of William III at Henley, and ever after he made that monarch his special hero, praising him in his writings whenever he could. In 1691 he published his first definitely identified work, a satire on a recent Jacobite plot against William, 'A New Discovery of an Old Intreague.' For many years he continued to essay poetry, but only on one or two occasions did he rise above mediocrity, his genius being essentially that of a prose writer. In 1692 his affairs, which had probably been going wrong for some time, partly through the multiplicity of his interests, forced him into bankruptcy with a deficit of £17,000. He may have gone into hiding from his creditors, possibly at Bristol. Then he compounded with them and, according to the testimony of a journalistic rival, Tutchin, he later discharged in full some of the obligations that had been scaled. Rejecting an offer to take charge of some business in Spain, he became secretary of a tile factory at Tilbury and was also for four years (1695–99) accountant to the commissioners of the glass duty. He seems to have had some reputation as a financier and he may have pleased the government by urging in a pamphlet a vigorous prosecution of the war against France ('The Englishman's Choice,' 1694). His writings between 1691 and 1697 are, however, practically unrecoverable and may not have been notable in quantity. By 1697 he had re-established himself in comfortable circumstances, and before the close of 1700 he had issued a considerable number of tracts dealing with the question of a standing army, with reformation of manners, with foreign affairs and with the vexed problem of the occasional conformity of Dissenters. The only work of extended compass and interesting to the general reader is the 'Essay upon Projects' (1697, but in part written earlier), in which he made numerous and often highly valuable suggestions about such matters of public interest as banks, insurance, good roads, asylums for idiots, and academies, especially for women, in whose welfare he was more interested than almost any other man of his time. The tracts on occasional conformity were vigorous performances that gave anxiety to easy-going Dissenters, and his strong defense of William's policy with regard to the army and in foreign affairs may have helped him to obtain the confidence of that monarch when a little later he was introduced at court.

Defense of William was also the occasion of his publishing in January 1701 the best of his poems and the most popular of all his early works, his satire 'The True-born Englishman.' Much prejudice had been stirred up against the foreign-born king, and in rough but energetic verses Defoe turned the tables by dwelling upon the mixture of stocks that made up the English people. Over 80,000 pirated copies were sold, and Defoe, who a little later for undeterminable reasons added the prefix to his name, for some years delighted to style himself on his numerous titlepages "The Author of 'The True-born Englishman.'"

Between January 1701 and March 1702 on the 8th of which month King William died, Defoe continued to be a fairly prolific pamphleteer. He still dealt with occasional conformity and foreign affairs, but he began more specifically to attack political abuses at home — corrupt elections to Parliament, the misdeeds of stockjobbers, Jacobite intrigues and the like. His powers as an acute arguer sure of making the average reader see his point and as a writer of homely, racy, fluent prose were now fully revealed. He also showed himself to be remarkably well informed on economic, constitutional and diplomatic questions, and full of a sturdy patriotism of the Whig variety. The most noteworthy of his pamphlets of this period are his weighty assertion of 'The Original Power of the Collective Body of the People of England' (December 1701) — a rebuke of the independence displayed by the high Tory members of Parliament which would have been worthy of Somers himself; and 'Reasons against a War with France' (October 1701), which to some students — though others take his reasoning literally — is the first of the tracts in which Defoe sought to attain his ends by irony and indirection — a war with Spain for the sake of colonial aggrandizement being his object despite the inevitably resulting struggle with France. 'Legion's Memorial' (May 1701) represents, however, the zenith of his short-lived popularity. The Tories had imprisoned the five presenters of the Kentish Petition (of which Defoe wrote a 'History') and he thought it time to protest in the names of the many — Legion. He presented the 'Memorial' to Harley, the speaker (in what manner is not clear), and the House dared not resent the bold action. On the release of the petitioners Defoe sat by their side at a complimentary banquet.

Several poems on various subjects and prose manifestoes against the High Church party followed; then, at the end of 1702, Defoe returned to the attack on occasional conformity, which was destined to cost him dear. The High Churchmen in power had carried through the Commons a bill to prevent the practice, which was, indeed, as Defoe held, a scandal from the point of view of consistency in ecclesiastical matters, but which, so long as occasional communion according to the rites of the Established Church was requisite to the holding of office, would certainly be pursued by ambitious Dissenters. Defoe's arguments were sincere and forcible, but unfortunately left him in an exposed position between the two firing lines. Perhaps it was to strengthen himself, whether with the Dissenters, who thought him a deserter, or with the Whig leaders, that he published in December 1702 his famous 'Shortest Way with the Dissenters,' in which, assuming the character of a High-Flyer, i.e., of an uncompromising churchman, he argued for the suppression of dissent by any means, no matter how cruel. It is hard to believe that he could have been taken seriously, but there is proof that he was. The Dissenters were alarmed by any hint of proposed persecution at such a time of partisanship; and, when the High Churchmen discovered that they had been applauding a Dissenter who was really aiming to secure toleration, they were furious at being hoaxed. The result was that Defoe, accused of libeling the Church, went into hiding for months — whether abroad or near London is not clear. He was arrested in Spitalfields near the end of May 1703, committed to Newgate, examined in vain as to his political backers, who, if he had any, deserted him, condemned after unfair proceedings, and sentenced to pay a fine, stand in the pillory and be imprisoned. He stood in the pillory on July 29, 30, 31, 1703, but the people draped it with flowers and read his clever 'Hymn' to the instrument of shame.

It used to be thought that Defoe remained in Newgate until August 1704; but it now seems clear from his correspondence with Harley (published by the Historical Manuscripts Commission, 1897, 1899) that through the good offices of the latter he was released about the first of November 1703. This not only disposes of the notion that he began his famous 'Review' in prison, but also makes it clear that he was not, as has been charged, drawing on his imagination when he described his personal experiences during and after the great storm of the end of November 1703 in his volume 'The Storm' published the next year. He was in prison long enough, however, for his business to go to ruin and his family to come to want, from which they were partially relieved by Harley. He had every reason to be grateful to that leader, and, although while serving him during the next 10 years, Defoe did and wrote much that it is impossible to regard as honorable, his offenses are mitigated by his position of dependence and by the loose examples in political morality set by the leading men of the time.

During and immediately after his imprisonment Defoe continued industriously to publish poems and pamphlets, adding as new topics, not only the 'Storm,' but the theological vagaries of John Asgill, regulation of the press and the state of the Episcopalians in Scotland. His main achievement, however, was the establishment (17 Feb. 1704) of his newspaper, *A Review of the Affairs of France,* etc., which, after several minor changes of title, became *A Review of the State of the British Nation.* Starting as a weekly this speedily became a bi-weekly and then a tri-weekly sheet. A literary department, supposed to be furnished by a 'Scandal Club,' appeared in early volumes. Defoe wrote practically the whole of the paper, which steered between the extreme Whig *Observator* of Tutchin and the extreme Tory *Rehearsal* of Leslie. Even during his long periods of absence in Scotland the numbers appeared regularly, spreading Defoe's fame and influencing later journalists like Steele. After some changes in title and manner of issue the *Review* came to an end with its ninth volume (of which the British Museum copy is the only one known and even that is incomplete) on 11 June 1713. Its success entitles Defoe to be called the first great English journalist, whether or not his affectation of independence must give him a high place among casuists. It should be added that in the main he supported the constitutional and religious principles in which he believed and was constant in his endeavors to promote peace with honor and commercial prosperity.

In the spring of 1704 Defoe was in frequent correspondence with Harley, and in the summer he took a trip through several counties to electioneer and gather information. Whether at home or on his journeys, he was continually writing. Between July 1703, when he issued the first of two volumes of his collected writings — a pirated volume had appeared some months earlier — and the same month of 1705, when the second volume probably appeared, he was responsible for at least 35 publications. The most important of these to the latter-day reader is the celebrated and able 'Giving Alms no Charity' (November 1704) in answer to a bill for employing the poor — an attack upon pauper legislation in a tone strikingly modern. His letters of 1705 show that he was receiving pay but did not know whether it came from Harley's pocket or the Treasury. He submitted his writings to his employer, communicated political intelligence, and in the summer and fall undertook another electioneering tour under an assumed name. Of the numerous publications of the year besides the *Review* the most important is 'The Consolidator, or Memoirs of Sundry Transactions from the World in the Moon,' a rather heavy prose satire on English politics. He showed his knowledge of American affairs in 'Party Tyranny,' written in defense of the Non-Conformists of South Carolina, a subject to which he recurred a few months later. Early in 1706 he had a rough pamphlet duel with Lord Haversham in defense of the ministry, and he discussed the new bankrupt law, a matter in which he was interested, as his creditors, stirred up by his numerous political enemies, were pressing him hard. Of the publications of the year the most important are the huge satire in verse 'Jure Divino,' creditable to his learning and his political principles but impossible as poetry, and his famous 'True Relation of the Apparition of one Mrs. Veal,' which has no superior as a realistic presentation of a supernatural event. The notion spread by Sir Walter Scott and others that this was composed to help the sale of Drelincourt's 'Fear of Death' was long since shown to be false; some 20 years ago the late G. A. Aitkin proved that Defoe merely reported with wonderful realism an apparition story current in Canterbury at the time.

The chief political events of 1706 were connected with the proposed union between England and Scotland. In May Defoe began publishing a series of acute, well-informed and conciliatory essays 'at Removing National

Prejudices,' which by January 1707 amounted to six in number. Meanwhile in September 1706 at Harley's orders he had set out for Scotland to help on the negotiations at the meeting of the Scotch Parliament. From October 1706 to December 1707 he continued at his post sending full and interesting letters to Harley, interviewing leaders of every faction, encountering the violence of mobs, publishing pamphlets — in short, making himself valuable in every way. Except for an occasional visit to a disturbed centre like Glasgow, he remained in Edinburgh, and part of the time he was in attendance on parliamentary committees, serving them by his knowledge of English commerce and finance, and picking up information about Scotland of which he afterward made much use. The pity of it all is that he passed, part of the time at least, as "Alexander Goldsmith," declared that he was in Scotland on his own business and in nobody's pay, and yet was continually writing begging letters to Harley, who was not prompt in forwarding funds. During the 15 months, besides maintaining his *Review*, he published a poem, 'Caledonia,' and several pamphlets.

On his return to England Defoe found Harley in political difficulties and in February 1708 learned of his fall. He immediately offered to share his superior's fortunes, but Harley discountenanced such romantic notions and turned his useful agent over to Godolphin, whom Defoe served with apparent fidelity until Harley came into power in 1710. This meant that Defoe was regarded as a permanent secret service man and not as an official of dignified and regular status. He visited Scotland again in 1708 and in 1709, and supported warmly the Whig measures of Godolphin and Marlborough both in his *Review* and in his pamphlets, which during these years apparently decreased in number. One reason for his not appearing oftener in his favorite rôle is probably to be found in the fact that he was at work upon his voluminous 'History of the Union of Great Britain' (1709) which, while scarcely interesting, is valuable and a clear proof of his interest in everything Scotch. In 1710 he naturally took his part in the Sacheverell controversy and on the dismissal of Godolphin he was glad to be employed once more by Harley. In the fall he visited Edinburgh as "Mr. Claude Guilot," for the purpose of undermining the Jacobites. By February 1710–11 he was back in London having frequent interviews with his chief and writing him letters full of suggestions and also of requests for money. Another visit to Scotland was made in the fall of 1712, but his travels in Harley's interest are not so important as the changed tone of the *Review* and of the pamphlets of the period. Defoe had the hard or, rather, impossible task of maintaining outwardly his journalistic independence and at the same time of abandoning his support of the war and his general Whig attitude. On the whole, he was fairly consistent, opposing vigorously as he did the passage of the Occasional Conformity Bill, but, of course, his path was a perilous one. The extreme Tories, who were powerful in the new Parliament, would not trust him, and the Whigs, whom he had deserted, detested him as a renegade. The modern reader, making allowance for the facts that it was a factious period, that regular party government was in its infancy, and that Defoe, both by his disposition and by his circumstances, was practically forced into his equivocal position between the Whigs and the Tories, finds it possible to admire the dexterity of his casuistry and the versatility and range of his activity. Between March 1710 and June 1713 when the *Review* came to an end, he published more than 60 pamphlets, besides at least two books. He dealt with Sacheverell, public credit and loans (essays erroneously attributed to Harley), the extravagant partisanship of the "October Club," the advantages of the South Sea trade, the reasons for advocating peace and the treaty of commerce with France, the impolicy of the Occasional Conformity Bill, the political reputation of Harley and the efforts of the Jacobites in favor of the Pretender. On the last topic he was specially effective. His five or more pamphlets (1712–13) are still readable, and one is amused in endeavoring to understand how the ironical 'Reasons against the Succession of the House of Hanover' should have misled the stupid as much as his 'Shortest Way with the Dissenters' had done 10 years before. This tract came near getting him into just as much trouble, certain Whigs who had themselves been prosecuted for their writings bringing an action against him for treason based upon his having written as a Jacobite. Defoe injured his cause by discussing the case in the *Review*; but Harley secured bail for him, and, after much manœuvring, since it was to the interest of both to keep their relations from being definitely known, however much they were suspected, he was finally pardoned under the great seal. The statement of some biographers that Defoe was a prisoner between April and November 1713 is shown by his correspondence with Harley and by contemporary newspapers to be an error. He was confined in the Queen's Bench Prison for only a few days.

Between June 1713 and August 1714 when the fall of Harley and the death of Queen Anne brought a change to his fortunes, Defoe wrote about 20 pamphlets (four of them forming an interesting 'General History of Trade') and labored upon two newspapers, *Mercator, or Commerce Retrieved*, and a sham *Flying Post*. He warmly welcomed the new king and, feeling that he must as far as possible clear himself from the charges of being a turncoat and a mercenary writer, he published in February 1715 his eloquent if not wholly ingenuous 'Appeal to Honor and Justice.' He was also the author of the three parts of the much criticized 'Secret History of the White Staff' (1714–15), a defense of Harley, which that unpopular person felt obliged to declare the work of an opponent. Whether he was nearly so ill from apoplexy as he wished readers of his 'Appeal' to believe is very doubtful, but there can be no doubt that he was in an equivocal position, distrusted by all parties and dependent upon his wits for the support of an expensive family.

Defoe's bibliography now becomes exceedingly complicated. In the four years that elapsed before the appearance of the first part of 'Robinson Crusoe' (25 April 1719) he published anonymously over 90 pamphlets, at least six books — including his popular 'Family Instructor,' the exemplary 'Memoirs of the Church of Scotland' and the forged 'Minutes' — worked on a series of political 'Annals of King George,’ edited the monthly *Mercurius Politicus* and *Mercurius Britannicus* and contributed to at least three newspapers. He was one of the most conspicuous figures of the time, but was at no period admitted to the brilliant literary circles of Swift and Pope and of Addison and Steele. Meanwhile he had been convicted (July 1715) of libeling Lord Annesley by the declaration that his lordship had tampered with the Irish troops in the interest of the Pretender, and it would have gone hard with him if he had not thrown himself on the mercy of Chief Justice Parker. The latter commended him to the Secretary of State, Lord Townshend, who found him very ready to serve the new government in a hazardous employment, to wit, as a spy in the offices of Jacobite newspapers. His chief connection of this sort was with *Mist's Journal* from 1717 to 1724, with intermissions. He took the sting out of articles and kept the government informed of what the disaffected Tories were doing and writing, doubtless justifying himself by the thought that he was serving the best interests of Great Britain and the Protestant religion. There is simply no defense for Defoe's conduct; but it should be remembered that as Harley's man he had become inured to intrigue, and it is at least to his credit that his skill made *Mist's Journal* popular. He continued to labor as an anonymous and outwardly renegade journalist, now editing his own paper—e.g., *The Whitehall Evening Post*—now contributing leading articles to *Applebee's Journal*, until 1726, long after his fiction had obtained popularity. Our knowledge of this portion of his career is largely due to the researches of Mr. William Lee, who in the second and third volumes of his great work published the choicest of Defoe's articles in which will be found some of the best of all his writings. Under the protection of Harley he had made himself the ablest political journalist of his time; left to his own devices, he became the ablest journalistic commentator on the general news of the day and on morals that England had yet known, with the exception, in certain particulars, of Addison. The later phase of his activity naturally fitted in with his writing of fiction and of utilitarian manuals, and in the combined functions he has probably exerted an almost unrivaled influence on English literature.

Defoe had shown in ‘Mrs. Veal’ and in his description of the supposed destruction of the island of Saint Vincent (*Mist's Journal*, 1718) his ability to write realistic narratives; but it was ‘Robinson Crusoe,’ founded mainly on the adventures of Alexander Selkirk on Juan Fernandez, as told by Captain Woodes Rogers, that gave the great journalist a high standing among world authors. The book, concerning the origin of which we know almost nothing, became popular at once, was pirated, printed as a serial and translated into French and German, and subsequent editions, translations and imitations have been almost numberless. A second part, ‘The Farther Adventures of Robinson Crusoe,’ was added in August 1719, and a third part, the ‘Serious Reflections,’ a group of essays now little read, appeared a year later. Neither the story that the first and best part was by Harley, nor the notion that Defoe used Selkirk's manuscripts, nor the theory that he gave in ‘Robinson Crusoe’ an elaborate allegory of his own life (partly supported by his language) will bear close investigation. That in his most famous book he made admirable use of a theme of universal interest, and that he employed in writing it all his resources as a realistic reporter and an imaginative projector, is proved by the position it has attained as a classic.

From the date of this success until 1727, that is, from his 60th to his 68th year, Defoe's work is simply astounding both in quantity and in quality. Of about 70 items some 30 are volumes and several of the remainder almost too large to be called pamphlets. To this period belong the picaresque stories ‘Moll Flanders’ (1722), ‘Colonel Jacque’ (1722) and ‘The Fortunate Mistress’ or ‘Roxana’ (1724) —unrivaled as studies in low life and showing growth on Defoe's part in character-drawing and plot-construction; the adventure stories of ‘Captain Singleton’ (1720) — remarkable for the knowledge displayed of African geography — and ‘A New Voyage 'round the World’ (1725) — interesting for its descriptions of the lower part of South America; the ‘History’ of a famous teller of fortunes, Duncan Campbell (1720); those portrayals of stirring historical epochs and episodes, ‘Memoirs of a Cavalier’ (1720), ‘A Journal of the Plague Year’ (1722)— probably Defoe's best work after ‘Robinson Crusoe’— and ‘Due Preparations for the Plague’ (1722); and those popular manuals of conduct, the curious ‘Religious Courtship’ (1722), and the two parts of ‘The Complete English Tradesman’ (1725, 1727). To these books, some of them masterpieces in their kind, must be added a ‘History’ of Peter the Great (1723), a book on the servant question (‘The Great Law of Subordination Considered,’ 1724), three volumes of an early guide-book (‘A Tour thro' the Whole Island of Great Britain,’ 1724, 1725, 1726), ‘The Political History of the Devil’ (1726) and ‘A System of Magic’ (1726), at least 10 pamphlets on famous criminals, such as Jack Sheppard, and several tracts on commercial, economic and social topics — some of them published under the assumed name of Andrew Moreton. There is scarcely another such record of literary activity on the part of an aging man, and these multifarious productions illustrate his times better than is the case with the writings of almost any other author. These were nearly always anonymous save in such a case as ‘The Four Years Voyages of Capt. George Roberts’ (1726), which describe the adventures among the Cape Verde Islands of a possible real seaman.

Between 1727 and his death Defoe published at least 30 books and tracts, among them ‘Conjugal Lewdness’ (1727), a well-meant but hazardous volume; ‘An Essay on the History and Reality of Apparitions’ (1728), ‘A New Family Instructor’ (1727), ‘A Plan of the English Commerce’ (1728) and a number of pamphlets many of which were specially designed to promote the better civic government of London. He also seems to have compiled for a veteran, Capt. George Carleton, a volume of ‘Memoirs’ (1728) describing experiences as a soldier and prisoner in Spain, which has been too implicitly trusted by historians, and for a certain Robert Drury a volume entitled ‘Madagascar’ (1729), giving an account of the young man's captivity on that island. These books are frequently ascribed to their putative authors, and the first has been attributed to Dean Swift, but there is good reason to hold that Defoe was mainly responsible for them. It is pleasant to believe that his incessant labors enabled Defoe to spend some of his last years in comfort at Stoke Newington; certainly, from the account of him given by his son-in-law, Henry Baker, the naturalist, he must have had a fair income. About 1730, however, at a time when he was working on a periodical, *The Political State of Great Britain*, founded by an old rival, Abel Boyer, he seems to have deeded his property in trust for his wife and daughters to one of his sons, who apparently was false to his trust. Defoe, probably to escape some of his old persecutors, went into hiding, and in April 1731 died in London lodgings. Mystery surrounds his last days, and there are numerous passages in his more active period that need to be cleared up. The man's character, too, remains enigmatic, though we may be sure that he was neither the hero of the early biographers nor the unprincipled mercenary and liar of many contemporaries and some latter-day critics. Fortunately there is little doubt that in his combined achievements as journalist, pamphleteer, realistic novelist and miscellaneous purveyor of information and instruction he is unsurpassed among prose-writers. See ROBINSON CRUSOE.

Bibliography.— No edition of Defoe's works contains more than a small fraction of his writings. The best is that printed at Oxford in 20 volumes (1840–41). A good edition begun in 1840 by the younger William Hazlitt did not get beyond three volumes. 'The Compleat English Gentleman' and 'Of Royal Education' were first printed from a manuscript in the British Museum by Dr. Bühlbring in 1890 and 1895. There are two recent editions of the fiction — the excellent one in 16 volumes, edited by the late G. A. Aitken (1895), and that of equal scope, by Dr. G. H. Maynadier (1904). The most important biographies are those by Walter Wilson (1830, 3 vols.— very valuable for its account of Defoe's times), by William Chadwick (1859 — rather eccentric), by William Lee (1869), 3 vols.— the second and third containing Defoe's newspaper articles), and by Thomas Wright (1894, useful, but disfigured by the curious theory that Defoe kept a vow of silence for a period equal to that spent by Crusoe upon his island). Consult also John Forster's 'Historical and Biographical Essays' (1858), Minto's 'Daniel De Foe' ('English Men of Letters,' 1879) and D. W. Rannie's 'Daniel De Foe' (The Stanhope Essay, 1890). Lee's bibliography of 254 items (slightly amended by Wright) was long standard, but is now antiquated. His selections from Defoe's newspapers, although unsupported by much external evidence, seem to have been made with great skill. Consult for further information the present writer's chapter in the ninth volume of 'The Cambridge History of English Literature' and his volume on Defoe in the 'How to Know the Authors' Series' (1916).

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DE FONTAINE, Felix, American journalist: b. Boston, Mass., 1832; d. Columbus, S. C., 11 Dec. 1896. The first statement given to the North of the attack on Fort Sumter was written by him; and he was correspondent of the Charleston *Courier* from the principal battlefields during the Civil War. Subsequently he went to New York, and was connected with the *Herald* much of the time until his death. He was the author of 'Cyclopædia of the Best Thoughts of Charles Dickens'; 'Gleanings from a Confederate Army Note-Book'; and 'Birds of a Feather Flock Together.'

DE FOREST, Jesse, the reputed founder of New York city and Walloon ancestor of many thousands of Americans: b. about 1575 at Avesnes, Hainault; d. 1624. He was married to Marie du Cloux, 23 Sept. 1601. In Sedan, also, on 22 July 1604, Henry De Forest, founder of Harlem, N. Y., and David de Forest, resident of New Amsterdam in 1659, were born. Jesse was a merchant dyer. His name appears next in the Walloon records of Leyden, where his daughter, ancestress of many New York families, was born in 1609, marrying in 1626 Jean Mousnier le Montagne. Many other members of the De Forest family were in Leyden, the majority of them recorded as natives of Avesnes. Isaac, the future ancestor of the American De Forests, b. 10 July 1616, was one of Jesse's four children born in Leyden. In all, it is probable that Jesse De Forest had at least 10 children — his large family thus furnishing a noble motive for emigration. During the Great Truce, from 1609 to 1626, there were many thousand Walloon soldiers and others in the Dutch Republic. In July 1621, Jesse applied to King James of England, through Sir Dudley Carleton, in the name of 60 families of Walloons, for transportation to Virginia. The "round robin" was signed by 56 men, heads of families representing 227 persons, but the response of the Virginia Company was unsatisfactory. In April 1622, Jesse petitioned the States of Holland and again, on 26 Aug. 1623, the States-General, for aid, and the very next day received his authorization to enroll colonists. Twenty-six ships were sent by the Dutch West India Company to Brazil and Guiana, laden with thousands of fighting men and colonists, one of the latter being Jesse De Forest, who sailed out of the Maas River at Rotterdam on 23 December. He wrote an acunt of this voyage. On the ship *New Netherld*, 260 tons, commanded by Cornelis Jacob ey, of Hoorn, the company of Walloon settl, with Jesse de Forest's children, sailed for Aerica in March, via the Canary Islands, and uching at Oyapuk in Guiana, sailed northwa into the Mauritius (Hudson) River. Thei being yet no military occupation of New Nerland by the Dutch, this ship, with the arm yacht *Mackerel*, arrived in time to save th region from French occupation. These Waon settlers (see WALLOONS) began immediy to cultivate the soil and became the ancers of many thousands of Americans, many them eminent in the annals of war and pe, of invention, finance and philanthropy. s not known where or when Jesse De Fordied. Consult his journal in R. W. De Fores book; De Forest, J. W., 'The De Fore of Avesnes' (1900); and De Forest, R. , 'A Walloon Family in America' (2 vols., '05, 1914).

DE FOREST, John William, American novelist: b. Humphreysville, Conn., 31 March 1826; d. New Haven, Conn., 17 July 1906. He passed many years in independent study and foreign travel, becoming proficient in several languages; entered the army as captain at the outbreak of the Civil War and rose to major. Among his works are ‘History of the Indians of Connecticut’ (1853); ‘Oriental Acquaintance’ (1856); ‘Witching Times’ (1856); ‘European Acquaintance’ (1858); ‘Seacliff’ (1859); ‘Miss Ravenel's Conversion’ (1867); ‘Overland’ (1871); ‘Kate Beaumont’ (1872); ‘The Wetherell Affair’ (1873); ‘Honest John Vane’ (1875); ‘Justine Vane’ (1875); ‘Playing the Mischief’ (1876); ‘Irene Vane’ (1877); ‘Irene, the Missionary’ (1879); ‘The Oddest of Courtships; or, The Bloody Chasm’ (1881); ‘A Lover's Revolt’ (1898); ‘Overland’ (1899); ‘The De Forests of Avesnes and New Netherland’ (1900).

DE FOREST, Lee, American inventor: b. Council Bluffs, Iowa, 26 Aug. 1873. He was graduated at the Sheffield Scientific School of Yale University in 1896. He is one of the pioneers in the development of wireless telegraphy in America. He was vice-president of the American De Forest Wireless Telegraph Company in 1902–06, which was succeeded by the United Wireless Telegraph Company. He is vice-president of the Radio Telephone Company and the De Forest Radio Telephone Company since 1907. He was awarded a gold medal at the Saint Louis Exposition of 1904 for his work in wireless telegraphy. He has taken out over 100 United States and foreign patents on radio telegraphy and telephony; his most important contribution in this field is the “Audion” — detector and amplifier, which made possible the transcontinental telephone service, both by wire and wireless.

DE FOREST, Robert Weeks, American lawyer: b. New York, 25 April 1848. He was graduated at Yale in 1870, studied law at Columbia, and studied also at Bonn. He was admitted to the bar in 1871 and joined his father's and uncle's law firm, later with his brother and sons. In 1874 he became general counsel and in 1902 vice-president of the Central Railroad of New Jersey, and holds offices and directorships in several railroad and other corporations. He has taken an active part in several public movements and in 1888 became president of the Charity Organization Society, which office he still holds. In 1913 after 25 years of service as trustee he became president of the Metropolitan Museum of Art. He was chairman of the New York State Tenement House Commission in 1900 and was the first tenement house commissioner of New York city. In 1903 he was president of the National Conference of Charities and Correction and is a vice-president of the American Red Cross and vice-president of the Russell Sage Foundation. Since 1912 he is president of the American Federation of Arts.

DE FOREST WIRELESS TELEGRAPH SYSTEM, The. The inception of this system, invented by Dr. Lee De Forest, dates back to 1899. Dr. De Forest's original idea was to develop a receiver, working on an electrolytic principle, which would be entirely automatic in its actions, requiring no tapping back or decohering arrangement like the coherer, but allowing the use of a telephone receiver for rapid and accurate work. During the years 1901 to 1905 Dr. De Forest developed the radio telegraph system bearing his name. He was the first in this country to use alternating current generator and transformer at the transmitter as distinguished from the spark coil and direct current and the telephone receiver, with a “self-restoring” detector as distinguished from the filings coherer and Morse inker at the receiver station. These radical improvements put the radio art upon an engineering basis. In 1904 all then existing records for overland wireless transmission were broken in the service established between the World's Fair at Saint Louis and Chicago, 300 miles. Five months later the American De Forest Wireless Telegraph Company installed five high-power 35 k.w. stations for the United States navy, operating over distances of 1,500 miles. The electrolytic receiver was in 1906 supplanted by the De Forest Audion or ionic current detecter. The Audion and Ultraudion are more sensitive than any other types of detecters, absolutely reliable in action and enable operation over distances quite impossible with other types.

In an exhausted glass bulb are a hot filament, a cold plate and a grid wire electrode located midway between these two. In circuit between the plate and filament are connected a “B” battery and telephone receiver. The incoming high frequency impulses to be detected are led to the grid and the filament. The normal negative current passing by means of ions or electrons from filament to plate is more or less interrupted by the slightest negative change impressed on the grid electrode of the Audion. The action is self-restoring instantly upon cessation of the train of waves from the transmitter. In this way an operator listening in the telephone receiver hears an exact reproduction of the transmitted signals. The Audion permits radio telegraphy over immense distances.

In 1906 Dr. De Forest discovered that the Audion could be made to amplify weak telephonic currents and this without any distortion of the voice. The Audion amplifier was developed as a telephone repeater or relay to such a degree that in 1912 the American Telephone and Telegraph Company purchased a license under all the De Forest Audion patents for wire telephone purposes. Within a short time thereafter transcontinental wire telephony was an accomplished fact, an impossibility before the advent of the Audion relay. The Audion amplifier has been pronounced by eminent telephone engineers as the one radical innovation in the telephone art since the discovery of the microphone.

De Forest devoted most of his efforts from 1906 to 1910 to the development of radio telephony. Sixteen United States battleships were equipped with this system just prior to their historic round-the-world cruise. From 1913 to 1916 De Forest developed the Ultraudion receiver for undamped wave reception, and also the Oscillion, or oscillating Audion, as a source of high-frequency undamped waves, as a transmitter, especially for radio telephony. The United States navy has adopted the Ultraudion exclusively for all long distance reception, utilizing thousands of these bulbs each year. In 1915 there was installed at the large United States navy station at Arlington, Va., a high power radio-telephone transmitter employing over 500 Oscillion bulbs. These high-frequency currents generated by these lamps were controlled by a small “master” microphone. In receiving stations at Mare Island, San Francisco and Honolulu, Audion amplifiers and directors were installed, and the spoken voice was heard distinctly over 6,000 miles. Thus was first demonstrated the correctness of the prophecy made by De Forest in 1908 that transoceanic telephony would be achieved within 10 years. In 1917 attention was drawn to the discovery of De Forest that the Audion in connection with telephone receivers could be used as a source of musical sound. An elaborate musical instrument on this novel principle was developed. A large number of bulbs are controlled by keys corresponding to the keys of a piano. The pitch quality of the notes can be closely regulated through variable wide ranges by simple changes in the inductance and capacity connected with the various oscillating apparatus.

Lee de Forest.

DEFREGGER, Franz von, dā-frĕg'ėr, Austrian genre painter: b. Stronach, Tyrol, 30 April 1835. The son of a peasant, he early showed a talent for drawing and wood carving, which he practised untutored while tending his father's cattle. His career began late, for he lacked instruction till, in 1860, he went to Innsbruck to study sculpture under Michael Stolz, who, discovering his greater talent for painting, sent him to Munich, where he studied at the Academy under Anschütz. He later became a pupil of Piloty, to whose influence he is indebted for his technique. He soon found the sphere in which he was to score success — the delineation of Tyrolese everyday life and of many stirring episodes in the history of his native land. His ‘Joseph Speckbacher and his Son’ (1869, Ferdinandeum, Innsbruck), a patriotic scene of soulful conception, and ‘Wrestling Match in Tyrol’ (1870), a spirited representation of this popular sport of his countrymen, were received with great favor, and most of his subsequent efforts quickly found their way into the principal galleries of Germany and Austria. Among these may be noted ‘The Last Summons’ (1874, Vienna Museum), an episode of the rising of the Tyrolese in 1809; ‘Return of the Tyrolese Riflemen in 1809’ (1876, National Gallery, Berlin); ‘Andreas Hofer on his Way to Execution’ (1878, Königsberg Museum); ‘Storming of the Red Tower at Munich in 1705’ (1881, Pinakothek Munich).

He appears to even greater advantage in his village genre scenes, such as ‘The Prize Horse’ (1872); ‘The Zither Player’ (1876, Vienna Museum); the ironical ‘Fashionable Tyrolese’ (1882, National Gallery, Berlin); ‘The Fortune Teller’ (1891); ‘Before the Dance’ (1892). Keen insight into character and quaint humor are the main features of his compositions. He passed most of his life in Munich, where he became professor at the Academy in 1878, and was ennobled in 1883. A ‘Defregger Album,’ with text by Rosegger, was published in Vienna (2d ed., 1889–92). Consult Meissner, ‘Franz von Defregger’ (Berlin 1900).

DE FUNIAK SPRINGS, Fla., town, county-seat of Walton County, situated on the Louisville and Nashville Railroad, 80 miles northeast of Pensacola and about 25 miles north of the Gulf of Mexico. The industries of the place are those of an agricultural and fruit-growing country, which produces cotton, rice, sugarcane, grapes and peaches, manufactures turpentine, and has also important lumber, poultry and stock-raising interests. It is the site of a Presbyterian college, a State Normal School and the Florida Chautauqua. The waterworks and electric-light plant are owned by the city. Pop. 2,017.

DE GARMO, Charles, American educator: b. Mukwanago, Wis., 7 Jan. 1849. He was graduated from the State Normal University of Illinois in 1873; was principal of public schools, Naples, Ill., 1873–76; professor of modern languages at the State Normal University 1886–90, and president of Swarthmore College 1891–98. Since 1898 he has been professor of the science and art of education at Cornell University. He was elected president of the National Herbart Society in 1892 and is considered the leader of the Herbartian school in the United States. He has published ‘Essentials of Method’; ‘Herbart and Herbartians’ (1896); ‘Language Lessons’ (1897); a translation of Lindner's ‘Manual of Empirical Psychology’ (1889); ‘Essentials of Method’ (1889–1907); ‘Interest and Education’ (1902); ‘Principles of Secondary Education’ (1907–10); ‘Laboratory Exercises in the Art of Appreciation’ (1907); ‘Æsthetic Education’ (1913).

DEGAS, dė-gä', **Edgar Hilaire Germain,** French painter and engraver: b. Paris, 19 July 1834; d. September 1917. He was a pupil of La Mothe and studied at the Beaux Arts in Paris. He was one of the most interesting members of the impressionist school, having worked in pastel, etching, dry point and stone-engraving, producing numerous interiors of theatres and café-concerts, foyers of the opera, views of the circus and of laundries, studies of dancers, etc., and all with a masterly touch. He expresses a modern ideal of energy and uses a modern language for its expression. In order to say what he wanted he was obliged to master the human figure, and this he did with the thoroughness of the ancients. In pure draftsmanship he was unequaled. He also produced several portraits of Manet.

DEGENERACY. In every community there are individuals who fail to measure up to the physical norm and more especially to the mental and moral norm of the race. In a large number of cases this is due to the action of an unfavorable environment upon a normal constitution, but in another extensive group the constitution, be it physical, mental or moral, is itself at fault. The three types of defects are inextricably fused with one another, but in certain individuals the mental and more especially the moral inadequacy predominates, and these are known as degenerates. The basis of most degeneracy, if not of all, is some lesion of the nervous system or sense organs. Mere congenital blindness and deafness is often sufficient to reduce their victim to a state of idiocy unless early measures of education are taken. On the other hand, the fundamental defects may be obscure and inaccessible to the pathological anatomist of the present day. The neuro-sensory defects are often, but not always, accompanied by malformations of a more conspicuous character, known as stigmata. These include various distortions of the external ear, facial asymmetry, very early or very late closure of the cranial sutures, polydactylism and other digital anomalies and various signs of imperfect or abnormal development. Individual stigmata may be present in a person of normal mental and moral make-up, but the concurrence of a considerable number of stigmata is a fairly good sign of degeneracy.

The forms assumed by degeneracy are very various. The mental defect varies from utter idiocy, where the patient is unable to protect himself from immediate physical danger, through imbecility, where he is still incapable of carrying out the daily processes of dressing and undressing, washing, etc., to the various grades of feeble-mindedness, in which he is able to satisfy all his immediate personal needs, but cannot earn an independent livelihood nor associate with his fellows on equal terms. These grades of deficiency naturally shade into one another by insensible gradations. Even the lowest of them is compatible with the high development of some one power of the mind, such as the mathematical or musical faculty.

Mental degeneracy brings of necessity in its train a greater or less degree of inability to perform the customary moral duties and to discern and avoid the temptations of evil conduct. There are also certain malformations of the moral character which are less directly dependent on an atrophied mental development, and which indeed are consistent with a mentality normal or even supernormal in most respects. These may take the form of a general indifference to the claims of good and evil, with a consequent cold-blooded selfishness and brutality or of certain morbid and unnatural impulses. In the latter group of phenomena are included kleptomania (an unreasoning impulse to steal), pyromania (an unreasoning impulse to set fires), and the sexual perversions. These anomalies belong to that group of functional mental disorders known as psychasthenias, which are more or less intimately related with hysteria.

The causes of degeneracy are manifold. The racial poisons of alcohol, drugs and venereal diseases are responsible for a large proportion of the cases, though in many cases alcoholism and drug habits may be symptoms rather than causes of degeneracy. Any factor which enfeebles the mother — poverty, illness or the like — may injure the mental and moral constitution of the child as well as its physical constitution. However, the most important cause of degeneracy is in all probability the inherent inferiority of the stock. That certain forms of degeneracy exhibit a pedigree conforming to the Mendelian law is now an established fact. This hereditary quality of degeneracy, together with the fact that degenerates are often likely to have many children, owing to their immorality, makes the problem of degeneracy a most serious one. The so-called Jukes family cost the taxpayers of New York State millions of dollars in the course of the 19th century. For this reason many States have enacted laws making it legal in certain cases to perform on degenerates operations designed to prevent their propagating their kind. There has been a large amount of controversial literature, associated with the names of Nordau and Lombroso, designed to prove a connection between degeneracy and genius. This is for the most part too biased to be convincing. There is no doubt, however, that the existence of a degenerate taint is not inconsistent with genius. See ALCOHOLISM; CRIMINOLOGY; DEGENERATION; EUGENICS; FEEBLE-MINDED; IDIOCY; INSANITY; PAUPERISM.

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DEGENERATION. See MAN, CHRISTIAN ANTHROPOLOGY.

DEGENERATION. In medical pathology degeneration is one of the processes that occur in the cells of an organ whereby different grades of disintegration and shrinking take place. It is one of the retrograde or breaking-down processes in contrast to those of abnormal growth and increase, although in many of the degenerations both processes are going on side by side. When abnormal intracellular metabolism slowly converts the cell plasma into useless and abnormal substances the process is known as degeneration, and then following upon such degenerations there usually results a partial or complete death of the plasma, leading to the destruction of the cell. In large measure, according to the character of the substances produced in the degenerative processes, various forms of degeneration are known. If in the organs there is a deposit of a waxy or lardy substance derived from the serum of the blood, the degeneration is known as amyloid degeneration. This is very frequently found in several organs at the same time, and results in large part from the infectious diseases accompanied by nutritional disturbances. Thus, in connection with chronic tuberculosis and syphilis amyloid degeneration is apt to occur. Hyaline degeneration is another form, which takes place in the connective tissue by which that type of cell is rendered homogeneous. Hyaline degeneration commonly occurs in the arteries and heart-valves, and is frequently associated with chalky infiltrations in these structures. Colloid degeneration occurs in certain forms of cancer in which the substance in the cells resembles softened glue. Mucoid degeneration consists in the transformation of the leading tissues into a transparent, viscid, homogeneous mass consisting of mucins and pseudo-mucins. Mucoid degeneration takes place largely in the connective tissue in the epithelial cells, and sometimes as a result of the disturbance of the functions of the thyroid gland as in myxædema. Fatty degeneration is a degeneration in which fat globules are deposited in the cells. Albuminous degeneration, or cloudy swelling, as it is sometimes called, consists in a fine granulation of a number of cells in the body, particularly in the kidneys, liver and brain. This acute degeneration is very frequently associated with fatty degeneration, and is due in great part to anomalies of nutrition largely produced by bacteriological agencies, as in the infectious diseases, and also at times to auto-intoxic products having their origin within the body itself as a result of perverted oxidation. Pigmentary degeneration is another form, in which are deposited in the cells small or large quantities of iron compounds derived largely from the blood and known as pigments. The abnormal deposition of lime in living tissue is known as calcareous degeneration. It occurs in the walls of the arteries in arteriosclerosis.

DEGENERATION, a work of Max Nordau (1895), which aimed at a scientific criticism of those degenerates not upon the acknowledged lists of the criminal classes. «Degenerates,» asserted Nordau, «are not always criminals, prostitutes, anarchists, and pronounced lunatics; they are often authors and artists. These, however, manifest the same mental characteristics, and for the most part the same somatic features, as the members of the above-mentioned anthropological family, who satisfy their unhealthy impulses with the knife of the assassin or the bomb of the dynamiter, instead of with pen and pencil. . . . Now I have undertaken the work of investigating the tendencies of the fashions in art and literature; of proving that they have their source in the degeneracy of their authors, and that the enthusiasm of their admirers is for manifestations of more or less pronounced moral insanity and dementia.»

DEGENERATION AS A FACTOR IN EVOLUTION. Degeneration is a term used in biology to describe those not infrequent cases where an entire organism falls below the structural level of its young stages (ontogenetic degeneration) or its ancestors (phylogenetic degeneration); or where an organ in the same way loses its fullness of function and becomes more or less atrophied, abortive and simplified. Thus many parasitic worms, crustaceans, etc., are emphatically simpler than their free-swimming larvæ, and the sessile adult ascidian shows only traces of the vertebrate characters of the embryo. Examples of the degeneration of individual organs are the tail of a frog; the digestive system of the mature mayfly; the pineal gland of man (primitively a medium eye); the human wisdom-tooth; the spint-bones of the horse (metacarpals and metatarsals of lost digits); the lungs of certain salamanders, etc. As in the case of the feet of the horse the perfection of the entire structure is often dependent on the atrophy or loss of certain of their parts. The loss of the hind legs in the whale unquestionably permits it to offer less resistance to its motions in the water. On the other hand, the degeneration of an organ may be accompanied by no very great advantage to its owner. Thus a crustacean which starts with a well-developed eye may exhibit the gradual loss of this on assuming a dark habitat. Degeneration must be distinguished (1) from occasional abortion; (2) from reversion to an ancestral type; and (3) from the occurrence of rudimentary and undeveloped organs where a character possessed by ancestral types remains more or less undeveloped, or shows itself only in embryonic life. Degeneration may be due to the environment. Absence of food, heat, light, etc., may mean the absence of the necessary stimulus for the growth and maintenance of the organs; or superfluity of food may cause one system to preponderate over others. Nor can it be doubted that cessation of function checks the food-supply to a given organ, and in other ways helps to bring about its degeneration. Again, the mere pressure of a hypertrophied organ on its neighbors, particularly in the embryonic stages of growth, is capable of causing their atrophy But on the other hand, some less obvious cause — the fatigue of early life, a constitutional sluggishness, etc. — may share in conditioning degeneration, as in the case of the *Tunicata*. Weismann and others, however, would explain degeneration by what they call the non-operation of natural selection. On this view, organs are not only developed but maintained by natural selection; and if it happens that an organ is no longer an advantage in this struggle for existence (for example eyes in dark caves), then natural selection no longer maintains that organ and it disappears in the course of generation. In other words retrogressive variations have an equal chance of survival to that of progressive variations, and as the ways in which a complicated organ like the eye can deteriorate are vastly greater in number than those in which it can improve, the interbreeding of the surviving cave animals is sure to create sooner or later a race with defective eyes. Weismann applies this ultra-Darwinian conception especially to cases of purely phylogenetic degeneration — for example, to the slightly developed wings of the *Apteryx*. Many cases of degeneration properly so called appear hardly to require his subtle explanation, but find a sufficient one in the nature of the environment, in the effects of stopped function and in the constitution of the organism. The problem of ontogenetic degeneration is immersed in the obscurity that shrouds all the phenomena grouped under the law of recapitulation (q.v.). Degeneration is curiously distributed in the animal kingdom. There are groups, such as the vertebrates, in which with all the degeneration that may occur, a certain high level of structure is everywhere maintained. There are groups, such as the ascidians, which are distinguished by the universality of a degeneration at once phylogenetic and ontogenetic. Again, there are groups like the arthropods, where progressive and retrogressive lines of evolution are found in the closest proximity and interconnection. The *Crustacea* contain highly developed free-swimming forms, like the lobster or crab; hopeless vegetative parasites, like *Sacculina*, which nevertheless has a free-swimming larva; slightly modified ectoparasites, degenerate non-parasitic forms, such as the barnacles; free-swimming forms which pass through a vegetative parasitic stage in their existence; and forms in even more involved degrees of abortion. These forms are related to one another in a manner but distantly suggesting the extent of their degeneracy; neighboring genera may be at very different levels of organization. The insects are also characterized by a mingling of degenerate and non-degenerate forms. (See DEGENERACY; ENVIRONMENT; EVOLUTION, etc.). Consult Demoor, Massart and Vanderville, 'Evolution by Atrophy' (New York 1899); Lankester, E. R., 'Degeneration' (London 1880); Morel, 'Traité des dégénérescences' (Paris 1857).

DEGER, dā'gėr, **Ernst,** German painter: b. Bockenem, Hanover, 15 April 1809; d. Düsseldorf, 27 Jan. 1885. He was a pupil of Wach and Schadow, in Berlin and Düsseldorf, becoming a painter in oil and of frescoes and giving much attention to the latter form of work. He decorated the chapel at Castle Stolzenfels for Frederick William IV of Prussia, becoming in 1869 professor at the Düsseldorf Academy and member of the Berlin and Munich academies. Among his works are 'Pieta' (1830); 'Bearing the Cross' (1832); 'Annunciation' (1834); 'Virgin Adoring Christ' (1836); 'Madonnas and Seven Scenes from the Life of Christ' (1841–51, in Saint Apollinaris' Chapel, Remagen); 'Adam and Eve' (1853, Raczynski Gallery, Berlin). His works are noted for vigor and finish. He was a leader of the so-called «Nazarean School.» See NAZARENES.

DE GÉRANDO, zhā-räṅ-dō, **Joseph Marie,** BARON, French philosopher and statesman: b. Lyons, 29 Feb. 1772; d. Paris, November 1842. On the siege of Lyons in 1793 he took up arms in its defense, and greatly distinguished himself by his bravery, but was subsequently obliged to flee. He returned to France on the proclamation of an amnesty, and joined a cavalry regiment. While in garrison at Colmar he composed an essay on the theme proposed by the French Institute, 'Quelle est l'influence des signes sur l'art de penser?' and gained the prize. In 1799 he took office under Lucien Bonaparte as Minister of the Interior, and became Secretary-General of that department in 1804. In 1811 he was made a councillor of state, and in 1812 governor of Catalonia. In 1819 he commenced a course of lectures in the Faculté de Droit, in Paris, on public and administrative law, suspended in 1822, and resumed in 1828. He was raised to the peerage in 1837. De Gérando acquired great fame by his philosophical writings, in which he follows with some deviations the school of Condillac. His principal works are 'Des signes et de l'art de penser considérés dans leur rapports mutuels' (1800), an enlargement of the dissertation formerly written for the French Institute; 'De la génération des connaissances humaines' (1802); 'Histoire comparée des systèmes de philosophie' (1804), completed after his death; 'Du perfectionnement moral et de l'education de soi-même,' a treatise which gained the prize of the French Academy in 1825; 'De l'education des sourds-muets de naissance' (1827); 'Institutes du droit administratif français, ou eléments du code administratif réunis et mis en ordre' (1829–45); 'De la bienfaisance publique' (1839).

DEGGENDORF, dĕg'gĕn-dôrf, Germany, a town of Lower Bavaria, near the Danube, 39 miles northwest of Passau. It has manufactures of paper, linen, woolens, stoneware and matches. Its church of the Holy Sepulchre is visited annually by a large number of pilgrims. Pop. about 7,500.

DEGLUTITION, the physiological act of swallowing, or the process by which food is conveyed to the stomach. See DIGESTION.

DEGRADATION, a penalty inflicted on criminous clerics in the Catholic Church. It consists of two degrees, being either «verbal» or «actual.» The canon law specifies minutely the crimes for which the punishment of degradation may be legally inflicted. No jurisdiction is vested in bishops for degrading, except the causes determined by the law and the Pope. By «actual» degradation the offender, besides being deposed from the ministry, is deprived of his order and of the canonical privileges attached to his order, and in particular is delivered over to the secular arm for punishment; nor does any one who makes a violent assault on him incur the excommunication decreed against whoever violently attacks a cleric or a monk. By «verbal» degradation the cleric is deprived of all his clerical functions and stripped of his Church benefice if he holds any; but he retains the privileges of his order, and is not handed over to the secular power: he has right of appeal to ecclesiastical courts. If his offense merits imprisonment he must be shut up in some monastery or other ecclesiastical establishment; and though he is degraded, still were one to make an assault on him the assailant would, ipso-facto, incur excommunication. Nevertheless, since the sacrament or order imprints an indelible character, the degraded cleric, whether by actual or verbal degradation, is still priest or deacon or whatever he was before in the ministry; and his purely sacerdotal and sacramental acts, even his priestly absolution, if given *in articulo mortis* or in grave peril of death when no priest in full church communion is at hand, is valid. So, too, his celebration of the mass is valid though sacrilegious.

The process of actual degradation, which was formulated by Boniface VIII (1235–1303), is as follows: The culprit, in the attire of his order and bearing in his hands some instrument of his clerical functions, a chalice or a mass-book, is brought before the bishop. That emblem of his priestly state is taken away from him; then he is stripped of his ecclesiastical attire, and his head is shaven to obliterate the mark of the clerical tonsure. Finally the bishop addresses him in these words: «By the authority of God Almighty . . . we take away from thee the clerical habit and depose, degrade, and deprive thee of all order, benefice, and clerical privilege.»

DEGRADATION. See EROSION.

DE GRASSE, Comte. See GRASSE, COMTE DE.

DEGREE. A title given by a university or college to those who have completed a more or less definitely prescribed course of study. While educational institutions corresponding to our universities existed in ancient times, and while these undoubtedly gave to those who had completed a course of study some marks or title of distinction, the present academic degrees do not go back continuously further than the Middle Ages. As the titles doctor and master show, they were originally nothing more nor less than licenses to teach. They were also perfect synonyms; and it was only after some centuries of varying usage that the English universities came to appropriate the title of doctor to the higher faculties of theology, canon law and medicine, and the title master to the lower faculties of grammar and arts. The title of doctor was often applied to distinguished scholars, together with some laudatory epithet: thus Duns Scotus was known as the «Subtle Doctor,» and Thomas Aquinas as the «Angelic Doctor.» The degree was also sometimes conferred honorarily by the Pope or the Emperor, and those who received it in this manner were known as *doctores bullati*. Those who received their degree in course, the *doctores rite promoti*, had to prepare a thesis in Latin, read it in public and defend it against a doctor of their faculty, other selected adversaries, and in general against all comers. This custom survived in its original form in England until the middle of the last century. In Germany and America, though the doctoral dissertation is not read in public, the examination to which each candidate must submit consists in a large measure of a defense of his thesis against the members of his faculty or department.

The title of bachelor was not a degree at the time of its first appearance in the 13th century but merely indicated that its possessor had fulfilled certain preliminary requirements for the degree of doctor or master. As the mediæval courses varied from 4 years in arts to 14 in theology, the importance of the preliminary title varied much between the different faculties. In the higher faculties, and eventually in arts, it took on the significance of a degree, except in France, where to the present day it represents merely the completion of a secondary education. Another preliminary degree which gave the right to teach was the *Licentiate*, so called from the *licentia docendi*. The licentiate stood between the baccalaureate and the doctorate.

In England the bachelor's degree is usually the first to be conferred, after a course of three years. The courses for the ordinary or pass degree and the honors degree, which is subdivided into three or four classes or levels of merit, are different, and each may be taken in several different subjects (schools at Oxford, triposes at Cambridge). There are special bachelor's degree for those from other institutions, and in law and some other faculties. The master's degree in arts is generally conferred without further examination upon the passage of a certain term of years and the payment of certain fees. The various doctor's degrees are generally either honorary, or are only given upon the production of mature scholarly works of real value. The German and American schemes, however, have been adopted by some of the newer universities. The University of London and some other institutions confer degrees by examination upon those not in residence. The British universities outside of England follow in general the English scheme, except in Canada, where the American system of degrees has had more or less influence, and in Scotland, where there is a different established tradition. In Scotland the master's degree in arts is not proceeded by a baccalaureate. The German universities give no other degree than that of doctor except in the faculty of theology, where there is also the degree of licentiate.

The vast majority of the students at a German university take the degree under the faculty of philosophy, and indeed this is a necessary preliminary to the degree under certain other faculties. The doctor's degree is given after the presentation of a thesis and examination, and is divided into four grades of excellence: *rite*, *cum laude*, *magna cum laude*, and *summa cum laude*. The title of *privatdozent* may almost be regarded as a degree: it gives its possessor the *venia legendi*, or right of lecturing — collecting his own fees — at any German university. To acquire this right, a so-called *Habilitationschrift* must be prepared and accepted. The German system of degree prevails to a greater or less extent throughout the Continent, though in most cases the degree of licentiate or master are also given.

The French degrees are divided into those given by the state and those given by the university. The former consist of the several licentiates and doctorates, for the latter of which one or more dissertations are necessary. The latter consists of the doctorates of the university, which in general resemble the state doctorates.

In America, the older British system has been overlaid by the German plan, so that both master of arts and doctor of philosophy are given. The college course of four years, prescribed to a greater or less extent according to the university or college at which it is given, leads up to a bachelor's degree, usually in arts, science or philosophy, according to the amount of attention devoted to the classics and the natural sciences. These are given in most colleges and universities in four grades, of which the three higher are *cum laude*, *magna cum laude*, and *summa cum laude*. The various technical and professional schools, which may or may not require a college degree or a certain amount of college work for admission, give a bachelor's degree, except in the case of medicine and dental medicine, where the first degree is usually that of doctor. The master's degree is given upon the completion with credit of a year or two of post-graduate work, with or without the writing of a thesis. The doctorate in philosophy and science, and occasionally in theology and law, is given much after the German fashion, upon from two to five years of post-graduate work, the writing of a thesis and the satisfactory passing of written and oral examinations. For the most part the degree of doctor of letters (Litt.D.), doctor of laws (LL.D.) and doctor of divinity (D.D.) are conferred as honorary degrees. This practice of conferring honorary degrees has in many cases been grossly abused, and even the ordinary degrees given in course have been put to the entirely unnatural use of compliments or gifts.

The more familiar degrees are usually known by the following abbreviations:

A.A	Associate in Art.
A.B. or B.A	Bachelor of Arts.
A.M. or M.A	Master of Arts.
B.C.L	Bachelor of Civil Law.
B.D. or S.T.B. (*Sanctæ Theologiæ Baccalaureus* or *Scientiæ Theologicæ Baccalareus*)	Bachelor of Divinity.
B.Litt., B.L., or L.B	Bachelor of Letters.
B.L.L. or L.L.B. (*Legum Baccalaureus*)	Bachelor of Laws.
B.P., B.P.H., or Ph.B	Bachelor of Philosophy.
B.S. or B.Sc	Bachelor of Science.
C.E	Civil Engineer.
C.M. or Ch.M. (*Chirurgiæ Magister*)	Master of Surgery.
Ch.E	Chemical Engineer.
D.C.L	Doctor of Civil Law.
D.D. or S.T.D. (*Sanctæ Theologiæ Doctor*)	Doctor of Divinity.
D.Litt. or Litt.D. (*Litterarum Doctor*)	Doctor of Letters.
D.M. or M.D	Doctor of Medicine.
D.M.D. (*Dentariæ Medicinæ Doctor*)	Doctor of Dental Medicine.
D.V.M	Doctor of Veterinary Medicine.
D.S., D.Sc., S.D. or Sc.D	Doctor of Science.
E.E	Electrical Engineer.
J.D. (*Juris Doctor*)	Doctor of Law.
J.U.D. (*Juris Utriusque Doctor*)	Doctor of Civil and Canon Law.
L.H.D. (*Litterarum Humaniorum Doctor*)	Doctor of Letters.
LL.B. (*Legum Baccalaureus*)	Bachelor of Laws.
LL.D. (*Legum Doctor*)	Doctor of Laws.
LL.M. (*Legum Magister*)	Master of Laws.
Litt.B. (*Litterarum Baccalaureus*)	Bachelor of Letters.
Litt.D. (*Litterarum Doctor*)	Doctor of Letters.
M.B. (*Medicinæ Baccalaureus*)	Bachelor of Medicine.
M.C.E	Master of Civil Engineering.
M.D. (*Medicinæ Doctor*)	Doctor of Medicine.
M.M.E	Master of Mining Engineering.
Mus.B	Bachelor of Music.
Mus.D	Doctor of Music.
Ph.D. (*Philosophiæ Doctor*)	Doctor of Philosophy.
Ph.G	Pharmaceutical Graduate.
V.S	Veterinary Surgeon.

See COSTUME, ACADEMIC; DOCTOR; DOCTOR OF THE CHURCH; MASTER OF ARTS; UNIVERSITY.

DEGREES, Measurement of. After Newton had taught that the earth, on account of its motion round its axis, must be highest near the equator, and that the diameter of the equator must be longer, by one 230th part, than the diameter from pole to pole, the French wished to investigate the subject further by actual measurement. The measurement was begun with the result that the axis of the poles was found to be longer than a diameter of the equator, and that the earth was, in form, more like a lemon than an orange. For 40 years disputes were maintained on this point without settling the question; and at last the Academy of Sciences resolved, on the proposition of Condamine, to have a degree measured at the equator (the expedition went to South America in 1735), and one in Lapland (Kittis and Tornea being the extreme stations to which the expedition was sent in 1736). It was found that the northern degree was greater than that under the equator, and that Newton's conjecture was right. But the question still remained, How great is the flattening of our planet? The theory said one 230th part, if the earth had been in a perfectly liquid state when it began its rotation. The calculations, however, always gave different results, varying according to the different measurements adopted as the basis of them; for measurements had been made, not only in America and Lapland, but also in France, England, Hungary and Italy. When the French established their new and admirable system of measures and weights upon the basis of the metre, which was to be the ten millionth part of the distance from the equator to the pole (3.2808992 English feet, or 39.37 inches), it was necessary to know with accuracy the circumference and the flattening of the earth. A measurement, therefore, took place in France, not of one degree, but of 10 degrees, from Dunkirk to Formentera, one of the Balearic Islands. In Sweden in 1802 the degree, which 80 years before had been measured by Maupertuis, was now measured again with better instruments, and thus the circumference and flattening of the earth were pretty well ascertained. After the Peace of Amiens the measurements of degrees just made in England, under General Roy, by Lieutenant-Colonel Mudge, were connected with those in France; and thus an arc of 20 degrees, from the Balearic Islands over France and England, to the Orkneys, was measured, and the flattening of the earth calculated to be 1-304th (the most recent estimate being 1-292d). In India the measurement of a degree, begun by Lambton, was continued by Everest and completed by Walker. The measurement of an arc of 25 degrees 20 minutes from Hammerfest to Ismailia was completed in 1855. Similar measurements have been continued to the present time, and at the Geodetic Congress in London in 1900, it was announced that English experts were engaged in measuring an arc of the meridian of 104 degrees from Cape Colony to Alexandria, and had made considerable progress.

The annexed table shows the lengths of a degree of longitude for places at every degree of latitude from 0 degree to 90 degrees. It is computed on the supposition that the earth is a sphere.

Deg. lat.	English miles	Deg. lat.	English miles	Deg. lat.	English miles
0	69.07	31	59.13	61	33.45
1	69.06	32	58.51	62	32.40
2	69.03	33	57.87	63	31.33
3	68.97	34	57.20	64	30.24
4	68.90	35	56.51	65	29.15
5	68.81	36	55.81	66	28.06
6	68.62	37	55.10	67	26.96
7	68.48	38	54.37	68	25.85
8	68.31	39	53.62	69	24.73
9	68.15	40	52.85	70	23.60
10	67.95	41	52.07	71	22.47
11	67.73	42	51.27	72	21.32
12	67.48	43	50.46	73	20.17
13	67.21	44	49.63	74	19.02
14	66.95	45	48.78	75	17.86
15	66.65	46	47.93	76	16.70
16	66.31	47	47.06	77	15.52
17	65.98	48	46.16	78	14.35
18	65.62	49	45.26	79	13.17
19	65.24	50	44.35	80	11.98
20	64.84	51	43.42	81	10.79
21	64.42	52	42.48	82	9.59
22	63.97	53	41.53	83	8.41
23	63.51	54	40.56	84	7.21
24	63.03	55	39.58	85	6.00
25	62.53	56	38.58	86	4.81
26	62.02	57	37.58	87	3.61
27	61.48	58	36.57	88	2.41
28	60.93	59	35.54	89	1.21
29	60.35	60	34.50	90	0.00
30	59.75				

Measurement of a Degree of Longitude.— The degrees of longitude are largest under the equator, and diminish continually toward the pole. Under the equator a degree of longitude contains 60 geographical, 69.16 statute miles. If the form of the earth is not entirely regular, the degrees of longitude on the same parallel of latitude cannot all be of the same length; and it has been proposed to investigate this by actual measurement. This task is in the trigonometric part, as easy as the measurement of a degree of latitude; but in the astronomical part it is 15 times more difficult. The difference of the longitude of two places is determined by the difference of the hour of the day at the same point of time in the two; as a place situated 15 degrees to the east of another has noon a whole hour earlier. One hour, therefore, corresponds to 15 degrees, or 1,042½ statute miles, under the equator, or 5,504,400 feet; a minute of time to 91,740 feet, and a second of time to 1,529 feet. A mistake of a second of time, therefore, in calculating the longitude of two places, makes a corresponding error in space. To determine time within two or three seconds, by means of rockets, at a distance of 1,042½ miles is impossible; and while the measurement of an arc corresponding to this distance trigonometrically, may be attended with an error to the amount of 200 feet, an astronomical measurement would leave an uncertainty of 2,000 feet. The earlier measurements of the French were directed, in the north, by Maupertuis; in the south by Bouguer. Since that time measurements have been made in all the great continents of the globe — in Pennsylvania, in the time of Maskelyne, by Mason and Dixon; at the Cape of Good Hope by Lacaille, completed by Maclear; in Prussia by Bessel; in Russia by Struve; in Denmark by Schumacher; and in England by Roy Kater and Colby. The French arc from Formentara to Dunkirk was measured by Mechain and Delamore. The results of the measurements, as given by Airy, make the equatorial diameter 7925.648, and the polar diameter 7899.170 miles. Bessel's results are almost identical namely, equatorial diameter 7925.604 and polar diameter 7899.114 miles. There is an international association, having as its main object the correlation of all degree measurements and connected data with the view of accurately ascertaining the figure of the earth.

DEGREES OF LATITUDE AND LONGITUDE. Degree of latitude is the space or distance on the meridian through which an observer must move to vary his latitude by one degree, or to increase or diminish the distance of a star from the zenith by one degree; and which, on the supposition of the perfect sphericity of the earth, is the 360th part of the meridian.

Degree of longitude is the space between the two meridians that make an angle of one degree with each other at the poles, the quantity or length of which is variable according to the latitude. See LATITUDE AND LONGITUDE.

DE HAAS, dė häs, **Maurice Frederick Hendrick,** Dutch-American marine painter: b. Rotterdam, 12 Dec. 1832; d. 23 Nov. 1895. He studied in England and at The Hague under Louis Meyer, and in 1857 was appointed painter to the Dutch navy. In 1859 he came to the United States and opened a studio in New York which remained his home henceforth. Among his paintings are 'Admiral Farragut's Fleet passing New Orleans'; 'Coast of France'; 'Sunset at Sea'; 'Moonlight at Sea'; 'Sunset at Pigeon Cove'; 'Sunrise in a Fog at Newport'; 'Shipwreck'; 'Menhaden Boats off Long Island'; and 'Off Marblehead.' His brother WILLIAM FREDERICK was also a well-known marine painter: b. 1830; d. 1880. He settled in New York in 1854. Among his pictures are 'Evening at Halifax'; 'Narragansett Pier'; 'Sunrise on the Susquehanna.'

DEHMEL, dā'mẹl, **Richard,** German lyric poet: b. at Wendisch-Hermsdorf in the *Spreewald,* of Slavic-German descent, 18 Nov. 1863. He was the son of a forester and got his first impressions of nature wandering in the oak forests tended by his father. After finishing the schools of his native city, he became a student at the Sophiengymnasium at Berlin, but later went to Danzig and was graduated from the Gymnasium in that city. At the university — chiefly at Berlin — he devoted himself to philosophy and the sociological and natural sciences. He finished at Leipzig with a thesis on the insurance business. Up to the year 1895 he was then secretary of the Association of German Fire Insurance Companies. In this difficult work he learned, as he himself states, self-control. While in this position he published his first books of poems, 'Erlösungen' (1891), 'Aber die Liebe' (1893) and 'Lebensblätter' (1895). After serving the insurance company for seven years, he resigned and moved to Pankow near Berlin. There he wrote 'Weib und Welt' (poems and fairy tales 1896); 'Der Mitmensch' (tragi-comedy, 1895); 'Lucifer' (pantomimic drama, 1899); and the children's book 'Fitzebutze' (1900; 15th ed., 1910), which he wrote in connection with his first wife, Paula Dehmel, from whom he separated in 1899. After remarrying and traveling for several years in Italy, Greece, Switzerland, Holland and England, he settled down at Blankenese, near Hamburg. In 1903 he published a lyrical novel 'Zwei Menschen.' In 1906 he published his complete works up to that date after having subjected them to a thorough revision. Later works are 'Michel Michael' (a comedy, 1911) and 'Schöne Wilde Welt' (new poems and proverbs, 1913).

In his earlier writings Dehmel was influenced by Heine and Schiller and later by Liliencron, Strindberg and Nietzsche. He claimed to stand as an artist between the pure empiricists like Liliencron and the pure metaphysicians like Mombert. His relation to Nietzsche he defined by saying: "Nietzsche is a doubting dissector of the ordinary emotions of the soul and I as a faithful believer give a synthesis of the unusual emotions." By some critics Dehmel is considered the greatest lyrical genius since Goethe. Others are willing to admit his genius but object to the extreme realism of some of his poems. To be just to him it is necessary to remember that he is constantly struggling toward higher levels. He stresses the importance of the feelings, but connects them with our intelligence. There is always with him an interaction of intellect and emotions. The result is a constant emphasis of the need of self-control and self-development. All about us, to be sure, are mysteries, but we must fathom them to the best of our ability. He has always been a hard worker and a champion of the rights of the workingman. His poems are finished in form and represent diverse metrical schemes. Dehmel volunteered his services in the European War, even though he was over 50 years of age. He was permitted to go to the front, was soon promoted to a lieutenancy and awarded the iron cross for distinguished services. Consult Lessing, O. E., ‘Masters in Modern German Literature’ (Dresden 1912). Also the histories of German Literature of Kummer and Biese.

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DEHORNING, the act or practice of depriving animals, specifically cattle, of their horns. Clippers or shears have been invented for the operation wherewith it is performed quickly and with comparatively little pain and scarcely any disturbance of the animal's normal functions or condition. The most favorable conditions of weather, etc., should be chosen for it, and the aid of a skilful operator is desirable. When all features of cruelty or unnecessary pain are avoided, there is believed to be much to justify the practice of dehorning, inasmuch as it tends, among other benefits, to convenience, safety and comfort in the handling of cattle, especially during their transportation from place to place.

DEHRA DUN, dĕh'rä doon. (1) A district in the United Provinces, British India. It lies at the base of the Himalayas. Good roads, cultivated fields, hedges, streams flowing through meadows — all, in parts of this district, look like some of the old country districts of the well-cultivated parts of Europe. The area is 1,209 square miles. (2) Dehra is the name of the chief town or capital of the district. It has an English garrison and contains a number of European inhabitants. Pop. 38,610.

DEI GRATIA, dē'ī grä'shĭ-a̤ (Lat. “by the grace of God”), a formula which many European sovereigns add to their title, and which is taken from an expression of the apostle Paul in the New Testament. It was first used by the clergy in the time of Constantine the Great, as an expression of dependence upon the grace of God; and afterward the higher clergy came to use along with it the addition *et apostolicæ sedis* (by the grace of God and the apostolic see). In the time of the Carlovingian race the secular princes also assumed it; and in course of time it came to be regarded as asserting something like the divine right of kings and their independence of any earthly power. The expression has been made use of on the coins of many nations.

DEIAMBA, dā-yăm'ba, an African plant commercially known as Kongo tobacco. It grows wild in the marshy districts of Kongo. The flowers produce a narcotic effect when smoked.

DEIANIRA, in Greek mythology, a daughter of Œneus, king of Ætolia. Her father promised to give her in marriage to him only who proved to be the strongest of all his competitors. Hercules obtained the prize and married Deianira, by whom he had three children. When Nessus, a centaur, who had offered violence to Deianira, was dying by a poisoned arrow shot from the bow of Hercules, she accepted from him the present of his tunic, which Nessus said had the power of reclaiming a husband from unlawful loves. Accordingly, when Hercules became enamored of Iola, daughter of the king of Œchalia, she sent him the centaur's tunic, which caused his death. Deianira was so disconsolate at this event that she destroyed herself.

DEIDAMIA (*Deidameia*), daughter of Lycomedes: she bore Pyrrhus and Oneirus to Achilles, during his abode at Scyrus.

DEILER, John Hanno, American educator: b. Altoetting, Upper Bavaria, Germany, 8 Aug. 1849; d. 20 July 1909. He was graduated at the Royal Normal College, Freising, and studied at the Royal Polytechnic Institute, Munich. He taught in the public schools of Munich until 1871, and was principal of a German school in New Orleans 1872–79. He has been professor of German in the University of Louisiana and Tulane University since 1879. He has been connected with various German societies in New Orleans and has published ‘Das Redemptions-System im Staat Louisiana’; ‘Geschichte der Deutschen Kirchengemeinden im Staat Louisiana’; ‘Geschichte der Einwanderung von 1820–1896’; ‘Deutsche Gesellschaften von New Orleans,’ etc.

DEIMOS, dīmōs, and **PHOBOS,** the names respectively of the outer and inner satellites of Mars, discovered by Prof. Asaph Hall in the summer of 1877, with the 26-inch equatorial of the Washington Observatory. Deimos revolves about its primary in 30 hours and 18 minutes, while Phobos, a most extraordinary body, accomplishes its revolution in 7 hours, 39 minutes and 14 seconds, being at a distance of only about 3,700 miles from the surface of Mars.

DEIOCES, dē-ī'ŏ-sēz, Median king: fl. about seven centuries B.C. He rose from a private station to be the founder of the Median empire. By acting as arbitrator in the disputes which took place in his own vicinity, he had acquired a high reputation for wisdom and justice; and when the Medes, in consequence of their revolt from the Assyrians, stood in need of a sovereign, they found none whose claims to the honor seemed stronger than those of Deioces. Immediately after his election he assumed great state, surrounded himself with body-guards and built the city of Ecbatana, in the centre of which he resided, almost wholly hidden from public view, transacting all business by deputies. His administration was vigorous, and after a peaceful reign of 35 years he was able to transmit the throne, without a a contest, to his son Phraortes.

DEIOTARUS, dē-ī-ŏt'a-rus, Galatian tetrach: d. 30 B.C. He received from the Roman Senate the title of king of that province and Armenia Minor, on account of services rendered to the Romans in the Asiatic wars. In the civil war he joined the party of Pompey. Cæsar took from him Armenia, obliged him to march with him against Pharnaces, and left him nothing but the title of royalty. He was accused of having plotted against the life of Cæsar, from which charge Cicero defended him in an oration yet extant. After the murder of Cæsar he returned to his dominions, joined Brutus, and afterward fought with Octavius against Antony.

DEIPHOBUS, dē-ĭf'ō-bŭs, in Greek legend the son of Priam and Hecuba, who married Helen after the death of Paris, but was betrayed by her to the Greeks.

DEIPNOSOPHIST, dē-ĭp-nos'ō-fĭst (from the Greek *Deipnosophistæ*, learned men at dinner), one of an ancient sect of philosophers famed for their learned conversation at meals. The work or rather compilation, ‹Deipnosophistæ,› of the celebrated Greek grammarian and rhetorician, Athenæus, who flourished about two centuries before Christ, has preserved to posterity thousands of quotations and names of authors to the number of 700, that otherwise would have been lost. The «learned guests» in his voluminous work numbered 29, who meet and banquet for days, entertaining one another with excerpts which Athenæus must have gathered at great pains and labor from the library of Alexandria, afterward destroyed. The titles of books he puts into the mouths of his characters alone number 2,500.

DEIR EL-BAHERI, dār-ĕl-bäh'rē, or **DER EL-BACHRI**, is a temple site in the district of Thebes, on the west bank of the Nile, opposite Karnak, which is about five kilometers distant from it. At Deir el-Baheri are some remarkable ruins of a temple built on terraces up the hillside which edges the alluvial plain. This is known as the temple of Queen Hatasu. The building is probably contemporary with those of Luxor and Karnak, being erected in the same style of magnificence. The first exploration of this site is due to the efforts of Mariette and later of Naville under the auspices of the Egyptian Exploration Fund. Further excavations in 1906 unearthed the temple of Mentuhetep, and under the auspices of the Metropolitan Museum of Art the causeway of this temple was revealed. Consult Mariette, ‹Deir-el-Bahri› (Leipzig 1877); and ‹Egypt Exploration Fund Memoirs› (London 1894–1913).

DEIR-EL-KAMAR, kä'mär («convent of the moon»), a town of Syria, formerly the capital of the Druses, 13 miles south-southeast of Beyrout. It is situated on the side of a hill of a deep and picturesque glen of Mount Lebanon, on the opposite side of which stands the palace Bteddin, the summer residence of the Christian governor of Lebanon. The town's chief industry is the making of embroideries and rich stuffs. Wine and grain are the principal agricultural products. Pop. 8,000, mostly Maronites.

DEIRA, dē'ĭ-ra, an ancient Anglian kingdom stretching from the Tees to the Humber, and extending inland to the borders of the British realm of Strathclyde. With Bernicia it formed the kingdom of Northumbria. The union between Bernicia and Deira seems to have been rather unstable, for it was only under Edwin, Oswin and other strong kings, either of Deiran or Bernician blood, that a real united Northumbria existed; and when the struggle for supremacy among the English kingdoms resulted in the triumph of Wessex, the two northern kingdoms were allotted to separate earls. Finally Deira became a kingdom under the Danes. The story seems to be authentic that the slaves who attracted Gregory I in the slave market of Rome were from Deira.

DEISM, the belief in the being of a God, with the denial of the existence or even necessity of divine revelation, believing that the light of nature and reason are sufficient guides in doctrine and practice; a believer in natural religion only. Etymologically the words deist and theist are the same in meaning, only deist is from Latin and theist from Greek. Conventionally, however, they are widely different in import; the term theist being applied to any believer in God, and revealed religion, whether that believer be a Christian, a Jew, a Mohammedan, etc., or a deist properly so called. A deist is, as the definition states, one who believes in God, but disbelieves in Christianity, or more generally in revelation.

The term Deists, or Freethinkers, is usually employed to designate a series of writers who appeared in England in the 17th and 18th centuries and sought to establish Natural Religion upon the basis of reason and free inquiry, in opposition to all positive religions and without reference to supernatural revelation. They were critical, if not hostile, in their attitude toward Scripture. The first, in point of time, of the celebrated English deists was Lord Herbert of Cherbury, the publication of whose work, ‹De Veritate,› which appeared in Paris in 1624, began the controversy. There followed, on the same side, Hobbes, Tindal, Morgan, Toland, Bolingbroke, Paine and others. The standard work on the subject is the Rev. Dr. John Leland's ‹Deistical Writers,› first published in 1754.

DEISSMAN, dīs'män, **Gustav Adolf**, German theologian: b. Langenscheid, Nassau, 7 Nov. 1866. He was educated at Tübingen and Berlin and the Herborn Theological Seminary. He entered the ministry in 1890, became a teacher at Marburg in 1892 and at Herborn in 1895, and was made professor at Heidelberg in 1897 and at Berlin in 1908. He lectured at Cambridge (England) in 1907 and at Upsala in 1910, and received the honorary degree of D.D. from Aberdeen (1906), Saint Andrews 1911 and Manchester in 1912. He has published ‹Johann Kepler und die Bibel› (1894); ‹Bibelstudien› (1895); ‹Neue Bibelstudien› (1897); ‹Theologie und Kirche› (1900); ‹Die neutestamentliche Formel «in Christo Jesu»› (1892); ‹The Epistle of Psenosiris› (1902); ‹Die Hellenisierung des semitischen Monotheismus› (1903); ‹Evangelium und Urchristentum› (1905); ‹New Light on the New Testament› (1907); ‹Philology of the Greek Bible› (1908); ‹Light from the Ancient East› (1910); ‹Urgeschichte des Christentums in Lichte der Sprachforschung› (1910); ‹Saint Paul› (1912, in English; also in German and Swedish).

DEIST. See Deism.

DEISTIC, or **DEISTICAL**, pertaining to deism or the deists, containing the doctrines of deism or Natural Religion. See Deism.

DE KALB, Johann, French soldier: b. Huttendorf, Bavaria, 29 June 1721; d. Camden, S. C., 19 Aug. 1780. He was educated in the art of war in the French army. In 1762 he visited the Anglo-American colonies as a secret agent of the French government. He was a brigadier in the French service, when, 7 Nov. 1776, he made with Franklin and Silas Deane an engagement to serve in the forces of the revolted colonies: and in 1777 he accompanied

Lafayette to America. Congress appointed him a major-general 15 Sept. 1777, after which he joined the main army under Washington and was active in the events near Philadelphia, which preceded the encampment at Valley Forge. He served in New Jersey and Maryland till, in April 1780, he was sent to re-enforce General Lincoln, then besieged in Charleston. He was second in command under General Gates; and in the disastrous battle of Camden, 16 Aug. 1780, was at the head of the Maryland and Delaware troops, who maintained their ground until Cornwallis concentrated his whole force upon them. He fell in the charge upon his regiments before they gave way. He died at Camden three days afterward, and a monument was erected there to his memory in 1825, Lafayette placing the cornerstone.

DE KALB, Ill., city in De Kalb County, on the Chicago and Northwestern and other railroads, 60 miles west of Chicago. The industries of the city are the manufacture of wire and other iron products, agricultural implements, piano, nail and creamery-package works, glove and shoe manufacturing establishments. De Kalb has three banks with a combined capital of $350,000. The city is governed by a mayor and council of 10 members, elected for two years, and owns its own water-plant. The Northern Illinois State Normal School is located here. Settled about 1838, De Kalb was incorporated in 1877. It was the scene of an engagement in the Black Hawk War. Here after the battle Lincoln, Davis and Zachary Taylor held a conference. Pop. 9,036.

DE KAY, Charles, American poet, grandson of Joseph Rodman Drake: b. Washington, D. C., 25 July 1848. He was educated at Yale and was the literary and art editor of the New York *Times* during 30 years, 1876–1906, and art-editor of the New York *Evening Post* in 1907. From 1894–97 he was consul-general of the United States at Berlin, where, among his activities, he organized the Berliner Fechtklub on the lines of the New York Fencers Club which he had founded in 1882. Always interested in literature and art, he was one of the original founders of the Authors' Club (1882), the National Arts Club of New York (1889) and of the Circle of Friends of the Medallion (1907). He was managing governor of the National Arts Club. His poems are mostly founded on themes from Oriental, classical and literary history. Among his works are 'The Bohemian' (1878); 'Hesperus and Other Poems' (1880); 'The Vision of Nimrod' (1881); 'The Vision of Esther' (1882); 'The Love Poems of Louis Barnaval Kay' (1883); 'Life and Works of Barye, Sculptor' (1889); 'Bird Gods' (1898); and translation of Heinrich Heine's 'Letters' and of several works from the French.

DEKEN, dā'kĕn, **Agathe,** Dutch author: b. Amstelveen, near Amsterdam, 14 Nov. 1741; d. 14 Nov. 1804. She wrote a number of novels with her friend Elizabeth Bekker (q.v.) and poems, among them 'Liederen voor den Boerenstand' and 'Liederen voor Kinderen.' They give charming and truthful pictures of the life of the natives of Holland.

DEKKER, Eduard Douwes, Dutch novelist, pseudonym «MULTATULI»: b. Amsterdam, 2 March 1820; d. Nieder-Ingelheim, 19 Feb. 1887. He spent several years in government service in the Dutch East Indies, but resigned because of his disagreement with the Dutch government there. His story, 'Max Havelaar' (1860), is a forceful accusation of wrongs and scandals of the Dutch administration of Java. He later published many satirical works on social, political and philosophical questions, among them a volume of admirable 'Parables'; a novel, 'La Sainte Vierge'; a drama, 'Vorstenschool' ('The School of Princes'). After his death there appeared 'Geschiednis van Wouterje Pieterse' (1888); and 'Letters and Works,' published by his widow. His biography was written by Busken (in Ten Brink's 'Hedendaagsche Letterkundigen,' 1885).

DEKKER, or DECKER, Jeremias de, Dutch poet: b. Dort 1609 or 1610; d. Amsterdam 1666. His first published poetical work was 'The Lamentations of Jeremiah'; and several others which soon followed it were also translations. His 'Love of Gold,' a powerful satire, and his 'Goede Vrijdag,' or the 'Passion of Christ,' as well as his lyric poems, are still in high estimation; and his 'Epigrams' (Puntdichten) are, beyond dispute, the best of the kind which the literature of that period produced. The best edition of his poems, accompanied with a biography, was published by Brouerius van Nideck (1726).

DEKKER, or DECKER, Thomas, English dramatist: b. London about 1570; d. after 1637. He is first mentioned as a theatrical writer in 1597. He was one of the literary antagonists of Ben Jonson, who satirized Dekker in his 'Poetaster,' and the latter took his revenge in his 'Satiromastix.' He appears to have lived from hand to mouth, and been often in difficulties, imprisonments for debt being almost the only record, besides his works, that is left of him. Among his writings may be mentioned the 'Seven Deadly Sinnes of London,' a moral tract; the 'Double P P,' a violent tract against the Catholics; 'A Knight's Conjuring,' in which he introduces Chaucer, Spenser and many other dead poets; 'The Gull's Hornbook,' valuable as a picture of the time. Besides his own plays he co-operated with Massinger in the 'Virgin Martyr' and with Ford in the 'Sun's Darling,' a moral masque; the 'Pleasant Comedie of Old Fortunatus' (1600); and 'The Honest Whore' (1604); are among the most esteemed of his dramas. The number of Dekker's plays which have survived is about 28, of his tracts about 25. His works have been edited by Shepherd (4 vols., London 1873); selected edition by Rhys (1887); and his non-dramatic works by Grosart (5 vols., 1884–86). Consult Hunt, 'Thomas Dekker' (New York 1911); and the 'Life' by Bullen (in 'Dictionary of National Biography').

DE KOVEN, Anna Farwell, American novelist: b. Chicago, 19 Nov. 1862. She was graduated at Lake Forest University in 1880 and married to Louis Reginald De Koven (q.v.) May 1884. She is the author of 'A Sawdust Doll' (1894); 'An Iceland Fisherman,' a translation from Pierre Loti (1889); 'By the Waters of Babylon' (1901); 'Life and Letters of John Paul Jones' (1913); 'Les Comtes de Gruyère' (1914); also contributions in prose and verse to various periodicals.

DE KOVEN (Henry Louis), Reginald, American composer: b. Middletown, Conn., 3 April 1861. He was graduated at Oxford in 1879 and studied music in the leading cities of Europe. On his return from Europe in 1882 he took up his residence in Chicago, but subsequently moved to New York. From 1902 to 1904 he lived in Washington as conductor of the Washington Symphony Orchestra. He then returned to New York as musical critic of the *World*. His scores show refinement of instrumental coloring and harmony. His operettas have had great success, notably ‘The Begum’; ‘Don Quixote’; ‘Robin Hood,’ his greatest success; ‘The Fencing Master’; ‘The Three Dragoons’ (1899); ‘Maid Marian’ (1901); ‘Foxy Quiller’ (1900); ‘The Student King’ (1906). He also composed many songs, including ‘Oh, Promise Me’ and ‘A Recessional,’ and various music for piano and orchestra.

DE KOVEN, James, American Episcopal clergyman and educator: b. Middletown, Conn., 19 Sept. 1831; d. Racine, Wis., 19 March 1879. He was educated at Columbia College and at the General Theological Seminary in New York. After his ordination to the priesthood in 1855 he took a pastoral charge at Delafield, Wis., and at the same time became principal of the preparatory school for Nashotah Seminary, founded two years earlier. In 1859 this became Racine College and De Koven its first warden. He soon acquired a marked influence throughout the West, both in educational and ecclesiastical matters, in the latter taking up and carrying forward the teachings of the Oxford Movement. His most prominent appearance in this connection was in the General Convention of 1871, at a time when the ritual controversy ran very high. In bold and outspoken terms, which have become historical, he proclaimed and defended his position, with a marked effect on the legislation under discussion. When, however, in 1875, he was elected bishop of Illinois, a considerable majority of the standing committees of the other dioceses refused to confirm his election, regarding his views as dangerous. He labored diligently for the upbuilding of Racine College, where he remained until his death. The published volume of his sermons (1880) contains a preface by Mr. Dix, which gives some idea of his commanding position in the church life of his time.

DE KROYFT, dė kroift′, **Susan Helen Aldrich,** American author: b. Rochester, N. Y., 29 Oct. 1818; d. Dansville, N. Y., 25 Oct. 1915. She was graduated at Lima College, New York, 1843, and married Dr. William De Kroyft, of Rochester, who was killed on his wedding day by a fall from a carriage. Mrs. De Kroyft shortly afterward became blind. Her works include: ‘Little Jakey’ (1871); ‘Darwin and Moses,’ a lecture; ‘A Place in Thy Memory’ (1849; revised 1905); ‘Mortara’ (1888); ‘The Foreshadowed Way’ (1901); and ‘The Soul of Eve’ (1904).

DE LA BLACHE, dė-lä-bläsh′, **Vidal,** French geographer: b. Pezenas, Herault, 1845; d. Paris, 5 April 1918. He was educated at the Upper Normal School, from which he was graduated in 1863. He directed the issue of a series of maps which is known by his name and which was published in the ‘Historical and Geographical Atlas’ of 1890. In 1912 M. de la Blache was a member of the French delegation which arrived in New York on 7 April of that year with a bronze bust which was erected at Crown Point, Lake Champlain, N. Y., on 3 May following, in memory of Samuel de Champlain.

DELABARRE, Edmund Burke, American psychologist: b. Dover, Me., 25 Sept. 1863. He was graduated at Amherst College in 1886, and later studied at Harvard and Freiberg. In 1891–96 he was associate professor and after 1896 professor of psychology at Brown University. During the absence of Dr. Münsterberg in 1896–97 he was director of the Psychological Laboratory at Harvard. He is a member of the American Psychological Association and Fellow of the American Association for the Advancement of Science. He wrote ‘Ueber Bewegungsempfindungen’ (1891); ‘Report of Brown-Harvard Expedition to Nachoak, Labrador, in 1900’ (1902).

DELABORDE, dė lä-bôrd′, **Henri François,** Count, French general: b. Dijon, 21 Dec. 1764; d. 3 Feb. 1833. He distinguished himself in the Republican armies; fought through the whole of the Napoleonic wars and was ennobled in 1807. Upon the return of Napoleon from Elba he again espoused the cause of the emperor. With the advent of the Restoration he was brought before a military tribunal but was acquitted owing to a technical flaw in the wording of the charge.

DELACROIX, dė-lä-krwä′, **Ferdinand Victor Eugène,** French painter: b. Charenton-Saint-Maurice, near Paris, 26 April 1799; d. Paris, 13 Aug. 1863. His father was an ardent revolutionist who died when Eugène was seven years of age. He was sent to the Lycée Napoleon and then to the atelier of Baron Guérin to study painting. His first painting, ‘Dante and Virgil in the Infernal Regions,’ attracted much notice in the exhibition of 1822. This picture displayed a wide departure from the coloring and manner of the school of David, and accordingly it gave rise to enthusiastic praise on the one side; on the other to contemptuous depreciation, but everywhere to wonder. His ‘Massacre in Scio’ (1824) was a formal declaration of war against the school of the classicists, who named it a «Massacre of Painting.» These were followed by the ‘Execution of the Doge Marino Falieri’ (1826); the ‘Death of Sardanapalus’ (1827); and the ‘Murder of the Bishop of Liège’ (1830) — pieces painted with fire and vigor. His sympathy with the revolutionary party was shown by his celebrated picture of the ‘Goddess of Liberty at the Barricades.’ In 1831 he joined the embassy sent by Louis Philippe to the emperor of Morocco. To this journey we are indebted for several pictures remarkable for their vivid realization of Oriental life as well as their masterly coloring. They are the ‘Jewish Marriage’; ‘Muley Abderrahman With His Body-guard’; ‘Algerian Ladies in Their Chamber’; ‘Moorish Soldiers at Exercise’; and the several scenes of common life. In spite of his undoubted genius Delacroix failed in gaining popularity with the general public. He was commissioned not only with the decoration of public buildings, such as the Luxembourg Palace, the town-hall and the Louvre, but large paintings were executed by him for the Parisian churches, and the historical museum of Versailles contains two of his masterpieces — the ‘Battle of Taillebourg’ (1838) and the ‘Taking of Constantinople by the Crusaders’ (1841). In 1857 the Academy elected him a member of their body. An exhibition of his works was opened in 1864, containing 174 pictures and 303 drawings. Delacroix was an artist of great versatility; mythology, legend, history and poetry by turns furnished him with subjects, and in addition he painted portraits, allegorical and genre pictures, hunting scenes, etc.; but all exhibit at once his strength and his weakness — brilliant coloring and incorrect drawing. He is dramatic, passionate and intensely virile in his concepts. Consult Dargenty, ‘Eugène Delacroix par lui-même’ (Paris 1885); Robaut and Chesneau, ‘L'Œuvre complet d'Eugène Delacroix’ (Paris 1885).

DE LACY, William Henry, American jurist: b. Washington, D. C., 8 Feb. 1863. He was educated at Georgetown University and the Catholic University, Washington. He practised law from 1883 to 1906, was admitted to the bar of the Supreme Court of the United States in 1902, and from 1906 to 1913 served as judge of the Juvenile Court of the District of Columbia. He is also associate professor of common law at the Catholic University. He was one of the vice-presidents of the International Peace Congress, Washington 1910; was delegate to the American Prison Congress, the National Conference of Charities and Correction, the National Conference of Catholic Charities, etc. He is the author of ‘The Treatment of United States Prisoners by Probation’ (1906); co-author of ‘Administration of Justice in the United States’ (1910), and was a contributor to ‘The Catholic Encyclopedia’ (1914).

DELAET, dė-lāt', **Johan,** Dutch scholar: geographer and historian: b. Antwerp about 1582; d. Leyden (?) near the end of 1649. Little is known of his life except what he himself has occasionally set down in his own works. In 1624 he was established at Leyden and for 25 years thereafter he was busy publishing and editing books for the Elzeviers. As a director of the Dutch West India Company he had, of course, ready access to its records; while as co-patroon of Rensselaerswyck he had an especial interest in the country where his daughter, Johanna, and his son-in-law had made their home. Therefore, to popularize the knowledge of foreign lands connected with that company, he wrote his ‘Nieuwe Wereldt,’ which is an excellent compilation made from the works of a great number of foreign geographers and navigators (Leyden 1625). Five years later there appeared a second revised and enlarged edition, which contained several new maps. DeLaet's intention to give to his fellow-citizens as perfect a description of the New World as circumstances would allow was carefully carried out, so that a Latin translation, apparently with some additions, and a French translation followed within the next 10 years. This was followed later by a ‘History or Yearly Account of the Proceedings of the Dutch West India Company from its beginning to 1636,’ written in Dutch. Meanwhile, the Elzeviers were busily engaged in publishing a series of historical monographs on the countries of Europe and Asia, which, because of their appearance in extremly small form, were called the ‘Little Elzevirian Commonwealths.’ In the publication of these volumnes DeLaet played no small part, so that Struve, writing about a century later, says that DeLaet's must be considered the best of all that had appeared. The first of these was that on England (1625), almost half of which was taken up by a Latin translation, not DeLaet's, of the ‘De Republica Anglorum’ of Sir Thomas Smith. There followed in rapid succession the works on Italy (1628), Spain (1629), France (1629), the Belgian Confederation (1630), the Empire of the Grand Mogul or *True* India (1631), Persia (1633 and 1637), Portugal (1641), Poland, Lithuania, Prussia and Livonia (1642), and perhaps Turkey. It was in 1643–44 that DeLaet had his famous literary controversy with his compatriot, Hugo Grotius (q.v.), on the origin of the American aborigines, in which he completely vanquished the great Dutch statesman and the father of international law. DeLaet also published notable works along other lines. He edited the ‘Natural History’ of Pliny the Elder (1635), published a book ‘On Gems and Precious Stones’ (1647), gathered together and put in order the notes of the celebrated naturalist, Marggraf, on the natural history of Brazil (1648), and finally published an edition of Vitruvius (q.v.), ‘On Architecture,’ together with the works of several minor writers on the same subject. In all of these works, which were written in Latin with the exception of those concerning the Dutch West India Company, DeLaet proves his vast and profound knowledge, but he seems to have been confessedly a popularizer rather than a savant. Consult Wright, H. F., ‘Origin of American Aborigines: A Famous Controversy’ (Washington 1917); Foppens, J. F., ‘Bibliotheca Belgica’ (Brussels 1739); Nicéron, J. P., ‘Mémoires pour servir à l'histoire des hommes illustres dans la république des lettres’ (Paris 1737); Winsor, Justin, ‘Narrative and Critical History of America’ (Boston 1884–89).

Herbert F. Wright,
Division of International Law, Carnegie Endowment for International Peace.

DELAFIELD, Richard, American military engineer: b. New York, 1 Sept. 1798; d. Washington, D. C., 5 Nov. 1873. He was graduated from West Point in 1818 and was draughtsman to the American Boundary Commission appointed under the Treaty of Ghent. In 1819–38 he was assistant engineer in the construction of forts Monroe and Calhoun, had charge of the improvements on the Mississippi and of the building of the Cumberland road and the construction of Fort Delaware. In 1838 he was appointed superintendent of the Military Academy at West Point and held the position seven years at that time, and again from 1856 to 1861, when he was relieved at his own request. In 1855 he was senior member of a commission sent to the Crimea to report on modern methods of warfare; he prepared the report which was published by Congress in 1860. During the Civil War he assisted in organizing and equipping the New York troops and had charge of the construction of fortifications in New York harbor. In 1864 he was made chief of engineers, and retired in 1866 with the rank of major-general. He was a member of the commission for the improvement of Boston harbor and a regent of Smithsonian Institute (1865–67).

DELAGOA BAY, a bay on the southeast coast of Africa, in the Portuguese colony of Mozambique, partly enclosed by Inyack peninsula. It is about 70 miles long and 20 miles wide. Though crossed at its entrance by a shifting bar it is accessible to vessels of the largest class and is the finest harbor on the east coast of Africa. Several large rivers flow into it chief of which is the Komati. The Delagoa Bay Railway projected 57 miles from the port of Lourenço Marques to the Transvaal border extends 290 miles further to Pretoria and is the commercial highway regulated by the agreement of 1 April 1909 between Portugal and Great Britain for the transit of export and import goods with the Transvaal gold fields. Another railroad of which (1918) 44 miles were open for traffic is projected to the Swaziland border. Delagoa Bay was discovered in 1502 by Portugese navigators and has had a varied history of international dispute. It was blockaded by the British during the South African War (1899–1902) to enforce neutrality. In 1889 the Portuguese seized the railway and in 1900 were compelled by arbitration to pay $5,000,000 compensation. Consult Tesset, 'The Key to South Africa, Delagoa Bay' (London 1899). See PORTUGUESE POSSESSIONS IN AFRICA.

DELAGRANGE, dė-lā-grănzh, **Léon,** French aviator and sculptor: b. Orléans 1872; d. Pau 1910. He studied at the Ecole des Beaux-Arts, Paris. He produced several works well deserving of notice, including 'Love and Youth'; 'Girl Dancers'; 'A Huguenot'; 'The Templar'; 'A Florentine Page.' In 1907 he was president of the Aero Club of France, and in this year also made his first flight in an aeroplane. In 1908 and 1909 he made several sensational flights and established new speed records, notably at Doncaster, England, during a storm on 17 Oct. 1909 he established a world record — 6 miles in 7 minutes, 36 seconds. He received the decoration of the order of the Legion of Honor in 1909, and the following year a medal from the Paris Academy of Sciences. He was killed in an accident to his monoplane at Pau.

DE LA HIRE, dė-lā-ēr′, **Philippe,** French mathematician: b. Paris, 18 March 1640; d. there, 21 April 1718. He was a member of the Academy of Sciences and professor at the College of France. His chief work was in pure mathematics, but he was also an astronomer. Many of his papers are in the Memoirs of the Academy of Sciences. Among his writings are 'Nouvelle méthode de géométrie'; 'Sectiones Conicæ'; 'Mémoire sur la epicycloid' (1694); and 'Mémoire sur les conchoids' (1708).

DELAMBRE, dė-lăṅ′bl, **Jean Baptiste Joseph,** French astronomer: b. Amiens, France, 19 Sept. 1749; d. Paris, 19 Aug. 1822. In 1790, eight years after the discovery of Uranus, Delambre published the tables of that planet, although in that period it had but performed a small part of its 80 years' course. He also constructed tables of Jupiter and Saturn and of the satellites of Jupiter, which, with several treatises, procured him a reception into the National Institute. In 1792 he was appointed to measure the arc of the meridian between Dunkirk and Barcelona for the French government. With his associate, Mechain, he completed this work in 1799. In 1802 Napoleon appointed him Inspecteur-Général des Études, which post he resigned when chosen perpetual secretary of the class of mathematical sciences (1803). His first tables of the sun were published in 1792; in 1806 appeared his new ones. In 1807 he succeeded Lalande in the Collège de France and wrote his 'Traité d'astronomie théorique et pratique' (1814); 'Histoire de l'astronomie du moyen age' (1819); 'Histoire de l'astronomie moderne' (1821); 'Histoire de l'astronomie du 18e siècle.'

DELAMINATION, the division of the blastoderm into two layers, epiblast and hypoblast. See EMBRYOLOGY.

DE LANCEY, William Heathcote, American Protestant Episcopal bishop: b. Westchester County, N. Y., 8 Oct. 1797; d. 1865. He was graduated at Yale College in 1817; studied theology and entered the Episcopal ministry in 1822. He was secretary of the House of Bishops in the General Convention of the Episcopal Church of the United States 1823–29. Upon the reorganization of the University of Pennsylvania in 1828, he was chosen provost of that institution, which office he retained for five years. In 1839 he became bishop of the diocese of western New York. In 1852 he was sent as a representative of the Episcopal bishops of the United States to England.

DELAND, Ellen Douglas, American writer for girls: b. Lake Mahopac, N. Y., 3 Sept. 1860. She was educated in New York, but lived in Philadelphia until 1901. She has since lived in Boston and in Dedham, Mass, where her home now is. She is a suffragist and active in that cause, in the work of the Episcopal Church, and in various civic affairs, and a trustee of the Dedham Public Library. She is a member of the Boston Author's Club. Her published books include 'Oakleigh' (1896); 'Malvern' (1896); 'In the Old Herrick House' (1897); 'A Successful Venture' (1897); 'Alan Ransford' (1898); 'Katrina' (1898); 'Three Girls of Hazelmere' (1903); 'Josephine' (1904); 'A Little Son of Sunshine' (1906); 'The Friendship of Anne' (1907); 'Miss Betty of New York' (1908); 'The Girls of Dudley School' (1911); 'The Fortunes of Phoebe' (1912); 'Country Cousins' (1913); 'Cyntra' (1915).

DELAND, Margaret Wade (Campbell), American novelist: b. Allegheny, Pa., 23 Feb. 1857. She was educated at the Cooper Union, New York, and for a time taught drawing. In 1880 she married L. F. Deland and has since lived in Boston. 'John Ward, Preacher' (1888), her first novel, attracted wide notice. Other works are 'The Old Garden and Other Verses' (1887); 'Sydney' (1890); 'Florida Days,' a collection of sketches of travel; 'The Story of a Child' (1892); 'Mr. Tommy Dove and Other Stories' (1893); 'Philip and His Wife' (1894); 'The Wisdom of Fools' (1897); 'Old Chester Tales' (1901); 'Good for the Soul'; 'Dr. Lavendar's People' (1904); 'The Common Way' (1904); 'The Awakening of Helena Ritchie' (1906); 'An Encore' (1907); 'The Way to Peace' (1910); 'The Iron Woman' (1911); 'The Voice' (1912); 'Partners' (1913); 'The Hand of Esau' (1914); 'Around Old Chester' (1915).

DE LAND, Fla, town, county-seat of Volusia County, on the Atlantic Coast Line Railroad, about 60 miles southwest of Saint Augustine. It is a favorite health and winter resort, noted for its sulphur springs and its fine shell-paved and shaded streets. It contains Carnegie and Sampson libraries. The John B. Stetson University, a Baptist institution, was established here in 1887. The town owns its water plant. Pop. 2,812.

DELANO, Columbus, American lawyer and politician: b. Shoreham, Vt., 5 June 1809; d. Mount Vernon, Ohio, 23 Oct. 1896. He studied law at Mount Vernon, was admitted to the bar in 1831, and shortly after elected prosecuting attorney of the county. He was elected member of Congress in 1844 and voted against the declaration of war in Mexico; he was again elected to Congress in 1864 and 1866. He was delegate to the Republican conventions of 1860 and 1864, and member of the State legislature in 1863. In President Grant's first administration he was appointed Commissioner of Internal Revenue, and reorganized the department, putting it on an excellent financial footing. In 1870 he became Secretary of the Interior, resigning in 1875 and retiring from public life. He was one of the trustees of Kenyon College and endowed its preparatory department.

DELAPLANCHE, dė-lä-plänsh, **Eugène,** French sculptor: b. Paris (Belleville) 1836; d. there, 9 Jan. 1891. He was a pupil of Duret, received the grand prize of Rome, 1864, and the medal of honor 1878. Among his works are ‹Child and Turtle›; ‹Eve Before the Fall›; ‹Saint Agnes›; ‹Maternal Education›; ‹Harmony›; ‹Africa,› in bronze; ‹Music›; ‹Virgin of the Lilies,› in the Luxembourg; ‹Aurora,› also in the Luxembourg; ‹Circe›; ‹The Dance›; and a statue of ‹Auber› for the opera house. He is noted for grace and nobility of treatment and refinement of style.

DE LA RAMÉE, dė-lä-rä-mā', **Louise.** See OUIDA.

DE LA REY, dė-lä-rā'ė, **Jacobus Hendrick,** Boer general: b. Lichtenburg District of the Western Transvaal 1849; d. 14 Sept. 1914. He gained distinction in his first command against the Basutos, when very young, and served two years in the Volksraad, supporting Joubert. He commanded the Lichtenburg burghers at the outbreak of the Boer-British War, 1899–1902, which force served later in Cronje's western column. He distinguished himself at Magersfontein; in the retreat before Lord Roberts, and at Nooitgedacht 1900, where he captured 500 English troops. He proved himself a resourceful leader in the guerilla warfare that marked the later stages of the war, his principal achievement being the capture at Klerksdorp, 7 March 1902, of Lord Methuen with many of his men, but he released him on account of not being able to treat his wounds, as he was lacking hospital facilities — an instance of humanity that made a most favorable impression on his foes. He served on the Boer committee which arranged for peace, and later on the deputation visiting Europe and the United States to raise funds for the Boers that they might continue their occupations at home. In 1907 he became a member of the legislative assembly and was later called to the senate.

DE LA RIVE, Auguste Arthur, Swiss physicist: b. Geneva, 9 Oct. 1801; d. Marseilles, 28 Nov. 1873. He received the appointment to the chair of natural philosophy in the Academy at Geneva at the age of 22. First devoting himself to the study of the specific heat of gases, and of the observation of the temperature of the earth's crust, he soon turned his complete attention to electricity, making original discoveries in connection with magnetism, electrodynamics, the relation between magnetism and electricity, and the properties of the voltaic arc, and presenting new theories on the subject of the aurora borealis. He discovered the process of electro-gilding, for which he received the grand prize of 3,000 francs from the Academy of Sciences 1842, becoming one of the eight foreign associates of the Academy in 1864. His chief work was a complete treatise on electricity in three volumes, which was translated into several languages, and was considered of the highest authority upon the subject.

DELAROCHE, dė-lä-rosh', **Paul** (his real name was Hippolyte), French painter: b. Paris, 17 July 1797; d. there, 4 Nov. 1856. He entered the studio of Baron Gros, and rapidly rose to eminence as one of the greatest of modern painters in France. He visited Italy in 1838 and 1843. His subjects are taken principally from French and English history. Among others may be mentioned, Saint Vincent de Paul Preaching before Louis XIII on Behalf of Deserted Children›; ‹Joan of Arc Interrogated in Prison by Cardinal Beaufort› (Wallace collection, London); ‹Flora Macdonald Ministering to the Pretender after the Battle of Culloden›; the ‹Death of Queen Elizabeth,› a work greatly admired by French and generally reprobated by English critics; ‹A Scene of the Saint Bartholomew Massacre›; ‹The Children of Edward IV in the Tower›; ‹Cardinal Richelieu conducting Cinq Mars and De Thou up the Rhone to Execution›; ‹Cromwell Contemplating the Dead Body of Charles I,› 1831, ‹Nimes Museum,› one of Delaroche's most exalted efforts; the ‹Execution of Lady Jane Grey,› and the ‹Death of the Duke of Guise,› 1835, Chantilly Museum. What he considered his *chef-d'œuvre,* was the pictorial decoration of the hemicycle of the Palais des Beaux-Arts, on which he was engaged from 1837 to 1841. In this composition Delaroche has sought to illustrate the history of art from the remotest period to the present day, by representing, in one compartment, the great artists of all ages, painters, sculptors and architects. Notwithstanding the number of persons depicted (upward of 80), and the diversities of figure and costume, the whole presents a group in perfect harmony, with a coloring at the same time quiet and rich, and a correctness of drawing which leaves nothing to be desired. It has often been objected to Delaroche that the accessories of his pictures are finished with such minuteness as to divert the attention from the main subject. His signal merits consist in correct drawing, brilliant and harmonious color, and great distinctness and perspicuity in treatment, rendering the story of his pictures at once intelligible. Consult monographs by Mirécourt (Paris 1856); Halévy, ‹Notice sur la vie et les ouvrages de Paul Delaroche› (ib.

1858); Muther, ‹History of Modern Painting› (London 1907).

DE LA RUE, dĕl-a-roo′, **Warren,** English inventor and physicist: b. Island of Guernsey, 18 Jan. 1815; d. London, 22 April 1889. He was educated in Paris and followed his father's business, that of manufacturing paper wares. For this he invented many new processes and machines. He is best known for his application of photography to astronomy. In 1850 he constructed a large reflecting telescope at Canonbury, which was transferred later to Cranford, Middlesex. He was a member of the International Electrical Congress at Paris in 1861, president of the Royal Astronomical Society, and held other posts of honor. His reports of original observations in chemistry, astronomy and physics are of the greatest value.

DELAUNAY, de-lō′nā′, **Charles Eugène,** French astronomer: b. Lusigny, Aube, 9 April 1816; d. Cherbourg, 5 Aug. 1872. He studied at the École Polytechnique, becoming a mining engineer. He taught mechanical engineering at the Polytechnique and in the Faculty of Sciences of Paris, and was made a member of the Institute in 1855. In 1870 he became director of the Paris Observatory. Among his works are ‹Sur une nouvelle théorie analytique du mouvement de la lune› (1846); ‹Rapport sur les progrès de l'astronomie› (1867); ‹Cours élémentaire d'astronomie› (1876); ‹Traité de mécanique.› He left an unfinished work on ‹Théorie de la lune› (in 2 vols.). His ‹Life› was written by Thevenot (Paris 1878).

DELAUNAY, Jules Élie, French figure and portrait painter: b. Nantes, 12 June 1828; d. Paris, 5 Sept. 1891. He studied under Flandrin and at the École des Beaux-Arts. He received the Grand Prix de Rome in 1856 and then went to Italy where he perfected his drawing to such a marked degree that his sureness and strength in this branch of his art became his distinguishing characteristic. He won the first-class medal at the Paris Exposition of 1878; and at that of 1889 was awarded the medal of honor. He was made an officer of the Legion of Honor and a member of the Institute. His portraits are considered masterpieces. He executed the frescoes in the church of Saint Nicholas at Nantes, several panels at the Paris opera house and 12 paintings for the Palais Royal, which are hung in the hall of the Council of State. His ‹Diana› is in the Luxembourg Gallery, Paris, and the ‹Death of the Centaur Nessus,› and the ‹Lesson on the Flute› are in the Museum at Nantes. Consult Claretie, J., ‹L'Art et les artistes français.›

DELAUNAY, Louis Arsène, French actor: b. Paris, 21 March 1826; d. Versailles, 22 Sept. 1903. He made his début in October 1846, at the Odéon. In 1848 he acted at the Théâtre Français in the rôle of Durante, becoming secretary to the theatre in 1850. In 1877 he was appointed professor of dramatic declaration at the Conservatoire, and in 1883 became a member of the Legion of Honor. Till he retired (1887), he was one of the most accomplished actors on the French stage. He has found some of his greatest parts in the plays of Hugo, Pailleron, De Musset and Augier.

DELAUNAY-BELLEVILLE, Louis, French engineer: b. 1843; d. 10 Feb. 1914. He was educated at the Ecole Polytechnique and served in the Franco-Prussian War. Entering the Naval Engineering School in 1864, he joined the Belleville works at Saint Denis, near Paris, in 1867, rising to head of the firm. He invented the Belleville boilers used in various navies and the automobile known by his name. He was a grand officer of the Legion of Honor and one time president of the Paris Chamber of Commerce.

DELAVAN, Wis., city of Walworth County near Delavan Lake, on Rock River, 62 miles southwest of Milwaukee, and on the Chicago, Milwaukee and Saint Paul Railroad. It has some manufacturing interests, including knit goods and dairies. It is the seat of the State institution for the education of the deaf; and on account of mineral springs in the vicinity and the lake is a place of summer resort and the site of a summer school. The waterworks are owned by the city. Pop. 2,450.

DELAVIGNE, dė-lä-vēn′yė, **Jean François Casimir,** French poet and dramatist: b. Havre, 4 April 1793; d. Montmorency, 11 Dec. 1843. He was educated at the Lycée Napoléon, Paris, and in 1811 composed a dithyrambic on the birth of the king of Rome, which attracted considerable attention and procured him, from Comte François de Nantes, a situation in the revenue office. He competed unsuccessfully for the Academy prize. At the Restoration he published a set of elegies, ‹Messeniennes,› which deplored the faded glories of France. The patriotic fervor of these pieces won immediate and widespread popularity for their author. He produced in 1819 his tragedy of ‹Les vêpres Siciliennes›; ‹Comédiens› appeared in 1820, and the tragedy of ‹Paria› in 1821. The liberal political opinions expressed in this play alienated the patronage of the king. Louis-Philippe, duke of Orleans, secured a position for him as librarian of the Palais Royal, where he remained for the rest of his life. In 1823 appeared his ‹Ecole des vieillards,› his best comedy. This won for him membership in the Academy (1825). ‹La Princesse Aurélie› followed in 1828 and ‹Marino Faliero› (1829). Two patriotic hymns, ‹La Parisienne› and ‹La Varsovienne,› became very popular. Other works are ‹Louis XI› (1832); ‹Les Enfants d'Edouard› (1833); ‹Don Juan d'Autriche› (1835); ‹Une famille au temps de Luther› (1836); ‹La Popularité› (1838); ‹La fille du Cid› (1839); ‹Le conseiller rapporteur› (1840); and ‹Charles VI,› an opera (1843). He left Paris for a vacation in Italy but died before he reached his destination. His popularity in his day was well merited both on account of the simple reality of his works and his private virtues. Because he was so essentially expressive of his time his works are devoid of that imaginative universal quality which ensures posthumous fame. His collected works were published by his brother (1845 and later). His poems and dramatic productions were published separately (1863). Consult Sainte-Beuve, ‹Portraits contemporains› (Vol. V); Favrot, A., ‹Etude sur Casimir Delavigne› (1894).

DELAWARE. "The Diamond State", the smallest but one and the least populous of the 13 original States; southernmost of the Middle

DELAWARE

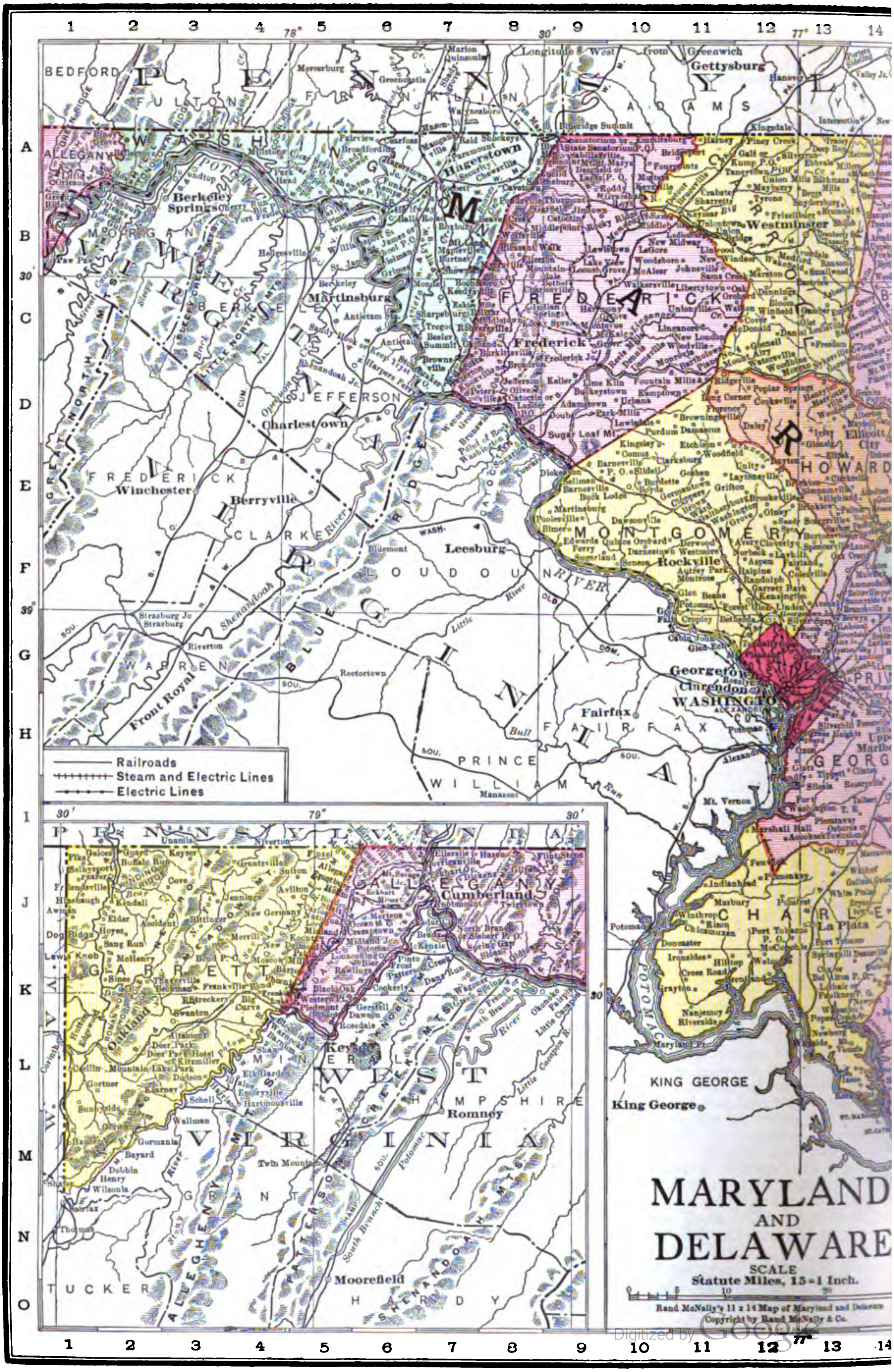
Estimated population, 213,380

COUNTIES

Pop.		
32,721	Kent	F 24
123,188	Newcastle	C 23
46,413	Sussex	H 25

Incorporated Cities and Towns

56	Bethany Beach, Sussex	H 25
370	Bethel	J 24
212	Bowers	F 25
939	Bridgeville	H 24
553	Camden	F 24
223	Cheswold	E 24
764	Clayton	D 23
176	Dagsboro	J 27
1,132	Delaware City	B 24
530	Delmar	K 24
3,720	Dover	E 24
216	Ellendale	H 26
374	Elsmere	A 24
255	Farmington	H 24
451	Felton	F 24
395	Frankford	J 27
659	Frederica	F 25
1,609	Georgetown	I 25
362	Greenwood	G 24
1,500	Harrington	H 24
209	Kenton	E 24
2,166	Laurel	K 24
271	Leipsic	E 24
2,158	Lewes	H 24
285	Little Creek	E 23
210	Magnolia	F 24
1,399	Middletown	B 25
2,603	Milford	H 25
451	Millsboro	I 23
193	Millville	J 24
1,038	Milton	H 27
1,913	Newark	A 28
3,351	Newcastle	A 26
722	Newport	A 24
302	Ocean View	J 28
585	Odessa	C 23
299	Port Penn	B 24
327	Rehoboth	I 28
155	Roxana	J 27
264	St. Georges	B 23
2,108	Seaford	I 24
342	Selbyville	K 27
1,843	Smyrna	D 24
494	Townsend	C 23
94,265	Wilmington	A 24
517	Wyoming	F 24



MARYLAND AND DELAWARE

SCALE
Statute Miles, 15=1 Inch.

Rand McNally's 11 x 14 Map of Maryland and Delaware

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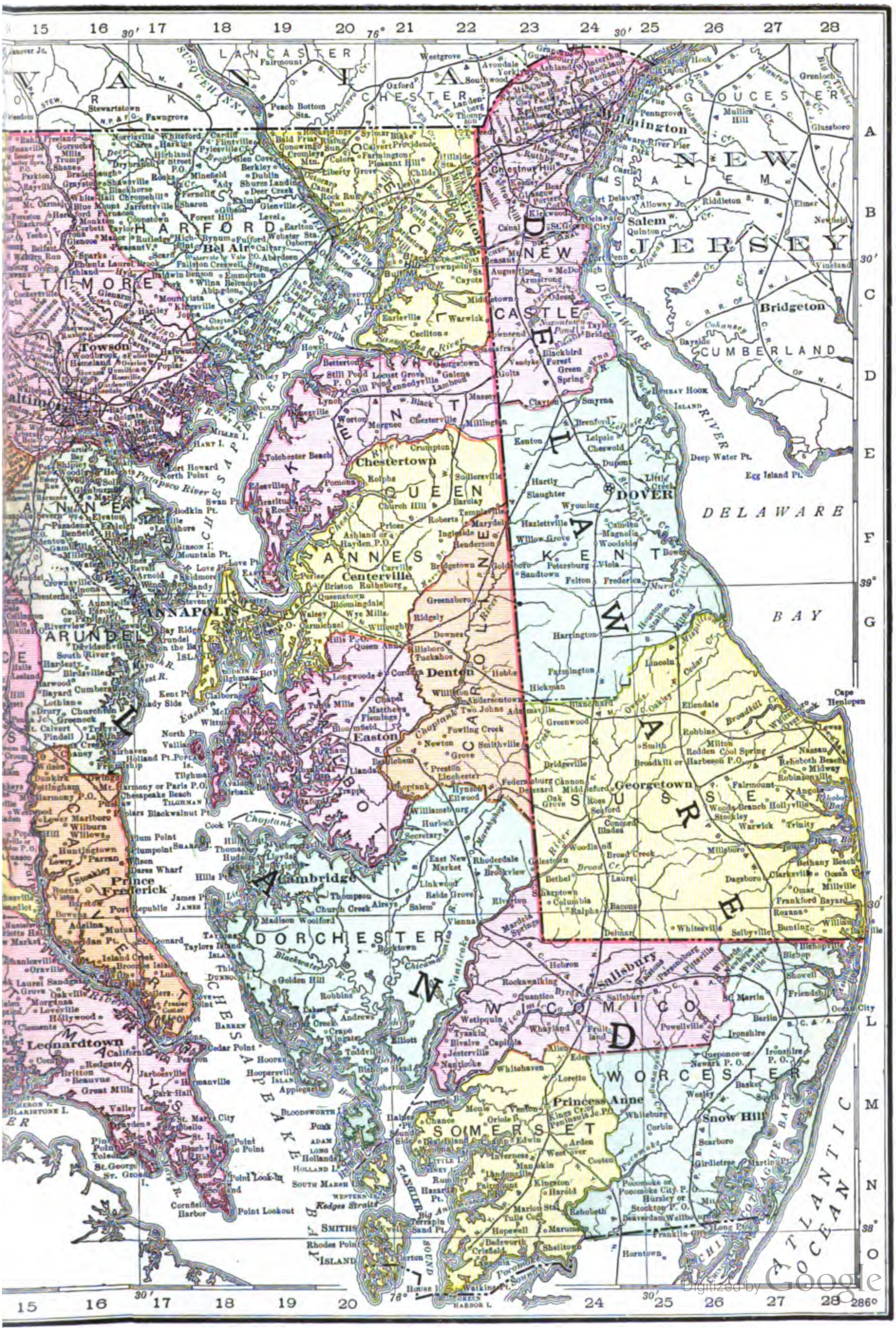
PENNSYLVANIA
LANCASTER
CHESTER
NEW JERSEY
SALEM
GLOUCESTER
CUMBERLAND
DELAWARE
NEW CASTLE
KENT
SUSSEX
MARYLAND
BALTIMORE
HARFORD
CECIL
KENT
QUEEN ANNES
CAROLINE
TALBOT
DORCHESTER
WICOMICO
SOMERSET
WORCESTER
ANNE ARUNDEL
CALVERT
ST. MARYS
Wilmington
Dover
Georgetown
Salem
Bridgeton
Baltimore
Towson
Bel Air
Annapolis
Chestertown
Centerville
Denton
Easton
Cambridge
Salisbury
Princess Anne
Snow Hill
Prince Frederick
Leonardtown
CHESAPEAKE BAY
DELAWARE BAY
DELAWARE RIVER
ATLANTIC OCEAN
TANGIER SOUND
Cape Henlopen
Point Lookout
15
16
17
18
19
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States; 96 miles long by 9 to 35 broad; 2,120 square miles in area; 1,960 square miles of land. It is bounded on the east by the Atlantic, Delaware Bay and Delaware River, the latter separating it from New Jersey; north by Pennsylvania, the boundary being a semi-circle struck 12 miles from New Castle Court-house; west and south by Maryland, arbitrary lines at a right angle. The broadest part is about 25 miles of the extreme south, whence it narrows almost regularly to the north. Capital, Dover, near the centre. Population of State (1916), 235,000.

Topography.— The whole peninsula between the Chesapeake Bay and the Delaware River estuary and bay, divided between Maryland and Delaware, is part of the Atlantic Coastal plain; flat, sandy and with frequent swamps, of which there is one of about 70 square miles in extreme southern Delaware. North of New Castle, where the Pennsylvania uplands sink down to it, there is a handsome rolling country; and behind Wilmington, the divide between Brandywine and Christiana creeks becomes a ridge rising as high as 438 feet, being the most elevated ground in the State. South of this, a loamy ridge, nowhere over 85 feet high, runs through the State northwest to southeast, forming the watershed between the bays, but following the line of Delaware Bay about a dozen miles inland. In the southwest, the part of the State west of the ridge is extensive enough to form a few fair-sized creeks, all feeding the Nanticoke in Maryland. On the east, flowing into the Delaware, are six or eight good-sized creeks navigable for vessels and steamers of small draft a distance of 6 to 11 miles, to four or five of the larger towns; while in the extreme north, the Brandywine and Christiana flow southeast from Pennsylvania, and uniting about a half-mile from the Delaware form a broad and deep stream (yet further deepened by the United States government), and together afford a commodious harbor, with fine water facilities, for the city of Wilmington, whose limits also extend quite to the Delaware River itself. The only other good harbors on this marshy coast are at New Castle and Lewes, the latter protected by the Delaware Breakwater at Cape Henlopen, constructed of heavy granite masonry, 2,800 feet in length, exclusive of the «ice breaker,» which is 1,700 feet long. This whole structure cost $2,125,000, and was more than 40 years in building. Conrad, in his ‹History of Delaware,› says it «is one of the most important and wonderful works of internal improvement in the United States.» On the southeast coast are two large but shallow lagoons called Rehoboth Bay and Indian River Bay, communicating at their outer edges, and separated from the sea by a sandspit pierced by the Indian River Inlet, through which vessels under six feet draft can pass to navigate the lagoons within. The Delaware Bay itself has 35 to 75 feet of water in mid-channel.

In November 1913, the government began building a canal, called the Inland Waterway, to connect Rehoboth Bay and Delaware Bay. It will have a depth of 6 feet, 40 feet minimum bottom width, be 12 miles long and cost $365,000.

A bill is also pending before Congress authorizing the government to buy the Delaware and Chesapeake Canal and, after enlarging it, make it a part of the nation's great system of inland waterways. The bill has been favorably reported and will no doubt become a law.

Natural Products.— The State has four geological divisions. (1) The Archean, comprising most of the State northwest of the meridian of Wilmington; (2) The Cretaceous, passing across the State as a northeasterly and southwesterly belt about 18 miles wide and 15 to 20 long, consisting of plastic clays and varieties of marl, extending south to the Appoquinimink Creek; (3) The Tertiary, embracing all the State south of the Cretaceous; (4) The Quaternary, which, as a later formation, covers all the others, the whole State over, with a broad sheet of gravelly deposit, of glacial origin, and known as the «Delaware gravels,» averaging 25 feet in thickness. When these gravels were laid down, the entire Delaware and Maryland Peninsula was submerged, forming an estuary like the present Chesapeake Bay into which the swollen Delaware emptied its detritus, covering the entire peninsula. The most valuable minerals, found in the north, near Wilmington, are granite quarries; kaolin or porcelain clay beds, among the first worked in the United States, and other clays for brick and terra-cotta. There are found also fine white glass sand, feldspar, shell marl, rich in potash in the green sand districts, and bog-iron ore in many of the swamps in New Castle and Sussex counties. The natural woods of the State are valuable but most of them have been cut away (including the white-oak for shipbuilding, once plentiful) except forests of cypress and other evergreens in the swamps. There is some shooting of wild ducks and wild geese, more of reed and rail birds, together with some other small game, and now and then a catch of the coveted diamond-backed terrapin.

Climate and Rainfall.— Delaware has naturally a range of temperature between the severe cold of New England and the heat of the South, still further tempered by the sea breezes which alternate with the southwest winds in summer. The northwest winds of winter and spring are not more severe than of old, but the delicate crops, like peaches, have furnished a more costly thermometer, and the precariousness of the spring warmth is felt. On an average the spring begins about 1 April, and the autumn frosts toward the middle of October; the average temperatures run from about 85° in August to 25° in January. The rainfall is from 40 to 46 inches annually, the heaviest on the coast; and droughts are rarely ruinous. In the swampy districts and southern lowlands, there is still some malaria, though much less than formerly; but as a whole, the State has a very good sanitary record.

Soils and Agriculture.— The soil of the State steadily lightens southward from a rich loam underlaid with yellow clay, in the north, and for some miles inland along the Delaware River, to a lighter loam with the clay, in Kent County, becoming in Sussex a very sandy loam without clay below. The north is the region of cereals and hay; the centre and south, of fruits, berries, grapes and vegetables; and the south especially of peaches and strawberries. The State is one immense market garden and orchard for the North, especially the great cities of New York, Philadelphia and Baltimore. New Jersey, Maryland and Delaware raise three-fourths of all the peaches, berries and other small fruits sold in those markets. Delaware in the popular mind is identified with the peach crop, but there is a growing tendency to replace this now uncertain crop with cereals, market gardening and especially apples. The other orchard fruits together exceed the peaches, the apple crop being very large. Experts pronounce the flavor of the Delaware apple very superior. The year's crop of 1918, though shorter than in former years, was 350,000 barrels.

Of the market gardening, the tomato is by far the principal crop, and it is exceeded only by that of Maryland. A surprising increase, however, in which it is alone among the Eastern States, has been in the wheat crop for the past two decades; its acreage in 1900 was 118,740, or nearly one-sixth of all the improved land, against 87,530 in 1880 and 125,000 acres in 1915. The first place in acreage, however, belongs to corn, with over 210,000 acres, and with a yield of 6,615,000 bushels. Third is hay, 77,000 acres, yielding 110,000 tons. There is also 11,000 acres of potatoes, yielding 1,095,000 bushels, or 100 bushels to the acre. The State raises 276,000 carriers of cantaloupes, 373 carloads of watermelons and 20,000,000 quarts of strawberries annually. The dairy interest has increased greatly in the decades; in 1910 there were 11 creameries against five in 1890 and 16 in 1916, counting shipping stations, the capital increasing from $19,085 to $300,000, and the value of the yearly products from $124,780 to $500,000. The largest creamery in the whole section is the Middletown Farms, which has a capital of $150,000, a yearly product of $450,000, drawing its milk from a country about 20 miles wide by 40 long. The annual value of the livestock of the State in round numbers is as follows: Horses, mules, milch cows and other cattle, $6,277,000; sheep, $55,000; swine, $400,000.

Outside of its one great manufacturing city, the agricultural interest is supreme; no other State compares with Delaware in the proportion of land under cultivation. Less than half the farmers own their own farms, and nearly the same proportion work on shares, though trucking in the south is increasing the number of owners of small holdings. The thin soil of the southern part of the State reduces the average value of farms from $70 in the north to $45 there, per acre. Fertilizers are used in the whole State, but from three to four times as much is needed in Kent and Sussex.

Manufactures.— While Delaware as a State is predominantly agricultural, the enormous relative magnitude of its one great city, Wilmington, and the industries concentrated around it, makes the northern end a very important manufacturing section. The great natural advantages of the spot were early utilized; the deep harbor for building the largest ships, the 126-foot falls of the Brandywine four miles from its mouth, and the proximity to the great coal and iron fields of Pennsylvania, Maryland and Virginia. All branches of iron and steel manufacturing are carried on to an immense extent. The first iron sailing vessel in the country was built in 1854 in Wilmington, which had previously been noted for building wooden ships; and that city has built iron and steel steamers of greater number and aggregate tonnage than any other single port in the United States. Pumping and mining apparatus and paper-making machinery and car-wheels are famous specialties; in 1817 the first endless-sheet paper machine was set up in Wilmington, revolutionizing the business. Its manufactures of steam and street cars, machine tools, engines, boilers, etc., are known all over the globe. Next to iron and steel comes the dressing and manufacture of leather, in which Delaware takes a high rank. Wilmington has several of the largest morocco plants in the world. The flouring-mill and textile industries are large. Paper is extensively made on the Brandywine, where, a few miles from Wilmington, the foremost and most interesting manufactory in the State is located — the great powder works of the Du Ponts, the oldest and largest of the kind in the country. The company was founded by the French exile Eleuthere I. Du Pont de Nemours in 1802 and till 1903 remained a family preserve; in that year it was turned into the E. I. Du Pont de Nemours Company with a capital of $20,000,000. It now has in several States many kindred plants. Besides making all kinds of explosives upon a colossal scale, the company is also making many other articles, such as chemicals, substitutes for ivory, shell, leather, etc. The total Du Pont industries represent a capitalization of $258,000,000. New Castle on the Delaware, six miles south of Wilmington, has the finest harbor in the State, and since the location there of many large manufacturing concerns, among others a branch of the Bethlehem Steel Works and the largest shipbuilding plant in this country, has become the second largest and most prosperous city in Delaware. The vulcanized fibre industry had its origin in the State and about seven-eighths of the world's output is made there. It is said that the waters of Delaware, like those of Ireland for linen, are peculiarly adapted to the manufacture of that product. The canning industry throughout the whole State is very large and embraces corn, peas, tomatoes, string and lima beans, sweet potatoes, strawberries, blackberries, pears, apples, potato-chips, fish-roe, chicken, ham, oysters, soups and plum pudding. The tomato canning alone annually averages over 30,000,000 "No. 3" cans, of three pounds each. The 1917 crop was 33,139,320 "No. 3" cans.

Fisheries.— The oyster, shad, herring, sturgeon and menhadden fisheries of the State are of considerable magnitude and value.

Commerce and Transportation.—Wilmington, Lewes and New Castle are ports of entry and the first is a customs district. It has some direct foreign commerce, a steamer line to New York and coasting lines to Philadelphia and down the bay, besides communication with Baltimore by the Delaware and Chesapeake Canal (see CANALS), 13½ miles long, 66 feet wide and 10 feet deep, completed in 1829. The great Delaware Breakwater opposite Lewes was begun in 1828 and finished in 1869 and forms an artificial harbor some 300 acres in extent, with 24 feet of water. (See DELAWARE BAY). Railroad facilities are excellent; there are about 400 miles of main track in the State. The one great line, which serves nearly all the State, is the Philadelphia, Baltimore and Washington, whose main line, double-tracked, runs through it lengthwise from Wilmington to Delmar at the southern boundary, where it connects with another to Cape Charles and Norfolk, Va.; its Delaware, Maryland and Virginia branch in the southeast serves that section. Eight other branches run from it. In the north, the Baltimore and Ohio and the Philadelphia, Baltimore and Washington division of the Pennsylvania system parallel each other through Wilmington, and the line to Philadelphia and Baltimore, the Maryland, Delaware and Virginia Railroad, runs across the State centre to Chesapeake Bay.

Banks, etc.— The State, national and savings banks of Delaware had (1918) a total paid capital of $6,521,075; a surplus of $9,695,040; deposits, $75,154,040 — total resources of all banking institutions, $91,370,155. There are a number of local fire and mutual life insurance societies.

Churches.— The strongest religious denomination is the Methodist Episcopal; next in order of size are the Presbyterian, Protestant Episcopal, Baptist, Roman Catholic, Quaker and Lutheran. There are several smaller bodies. Wilmington is the seat of the Roman Catholic diocese of the same name, embracing Delaware and part of the Southern Peninsula, and of the Protestant Episcopal diocese of Delaware.

Charities and Penal Institutions.— There is a State Almshouse and Insane Hospital. There being no State institution for the feeble-minded, deaf-mutes or the blind, the statutes permit five of the last, two from each county, and 14 imbecile children from the State to be maintained at institutions of other States; and they are so kept at Philadelphia and Washington. Wilmington has The Ferris Industrial School for Boys, founded by Dr. Caleb Harlan; two industrial colored institutions and one for colored boys; also the Gause Home for Friendless and Destitute Children. There is a public workhouse in New Castle County. There is a State prison at Greenbank, capable of holding 500 inmates. The whipping post is a punishment for many offenses such as burglary, arson, larceny, wife-beating, etc.

Good Roads, etc.—A new spirit of progress pervades the entire State, shown in better, modern roads, improved farming, finer homes, etc. General T. Coleman Du Pont spent $500,000 building in Sussex County a model public road from Selbyville on the extreme southern edge to Georgetown, and with characteristic liberality signed (Aug. 1918) an agreement to connect this road with a fine boulevard system north and south throughout the entire State. A joint county and municipal building, costing $1,500,000, was completed in 1916 in the city of Wilmington. It is a commodious and handsome structure. The capitol building at Dover has been enlarged and beautified and a large mural painting by Stanley M. Arthurs commemorating «The Departure from Dover Green, July 1776, of the First Delaware Regiment,» placed upon the walls of the senate chamber.

Various State Boards, etc.— There are the following State boards: Health; Medical Examiners; Dental Examiners; Education; Pardons; Trustees of Delaware College; Trustees of Delaware College for Colored Students; Agriculture; Trustees of State Hospitals; also a State Library Commission; State Revenue and Taxation Commission; and seven hospitals with capacity for about 700 and a tuberculosis sanatorium.

Education.— The public schools are supported by local taxes; by a State distribution of the income of a fund now about $944,407 and of the proceeds of certain taxes, both yielding about $180,875 a year, devoted entirely to «paying teachers' salaries and for furnishing free textbooks»; and by an annual appropriation beyond this, fixed by the constitution at a minimum of $100,000. The school year is 9 or 10 months in many schools throughout the State, though shorter in others. Attendance for all children between the ages of 7 and 14 for five months in the year is made compulsory by law, though any district may by vote reduce this period to three months. Thanks to the enthusiastic labors of Chas. A. Wagner, Ph.D., Commissioner of Education, an increased interest is being aroused throughout the State in the subject of education. One hundred and fifty «Parents' Teachers Associations,» with a membership of 3,600 have been formed, whose meetings have been attended by 20,000 persons — one-fifth of the State's population attending school at night. Wilmington has a fine school system which is excepted from the provisions of the general law; has its own superintendent of schools, with many handsome buildings whose architecture and equipment compare favorably with those in other cities. There are separate schools for colored children, their schools sharing equally with the white in the State school fund. They have a State Agricultural College near Dover and there is also at Clayton a Roman Catholic school for colored orphans. The Wilmington Conference Academy of the Methodist Episcopal Church is at Dover. Wilmington has two business colleges, while throughout the State are many excellent academies and high schools. Its one college proper, Delaware College, at Newark, was founded in 1833. The State supports an experiment station with courses in agronomy, animal husbandry and horticulture. The facilities of its agricultural department are placed at the disposal of the farmers of the State during the first week in January of each year, styled «Farmers' Week.» The college has greatly prospered in recent years. From 1870 to 1913 it was entirely supported by Federal and State appropriations. In 1914 the Alumni Association raised $67,000 and in 1915 $1,000,000 was donated for the purchase of land and the erection of new buildings. In 1914 the Woman's College of Delaware was established by the State and is sharing in the large growth and prosperity of the older institution. There is a State board of education and in each county a school commission and a superintendent of public instruction. Teachers' institutes are yearly held in each county.

Government.— The present constitution is of 1897; following its own practice — as is also the custom of a number of Southern States — it was framed by a convention elected by the people, but was not submitted to the people. The registration and educational provisions in part exclude unfit electors. The legislature has a senate elected for four years and a house for two. Seven members from New Castle County and five each from Kent and Sussex compose the senate, and 15 members from New Castle and 10 each from Kent and Sussex the house. Sessions are biennial. Provisions for revenue and impeachment are the same as in the national Constitution. The members are paid $5 a day for 60 days, after which they sit at their own expense; special sessions are thus limited to 30 days. All State and county officers are chosen for four years, save the State treasurer and auditor, and county sheriff and coroner, chosen for two. The governor's veto includes any item of a bill for raising revenue; his pardoning power is on recommendation of a board of pardons. «The judicial power is vested in a supreme court, a superior court, a court of chancery, an orphans' court, a court of oyer and terminer, a court of general sessions, a register's court and justices of the peace»; there are six judges — a chancellor and five «law judges,» of whom one is chief justice — all appointed by the governor for 12 years with the concurrence of the senate. The State has one representative in Congress and three members in the Electoral College, chosen by popular election.

From 1889 to 1895 the Hon. Anthony Higgins, a Republican, represented Delaware in the United States Senate and throughout his distinguished career therein maintained the former prestige of the State. In 1895 he was defeated for re-election and, owing to political entanglements, no senatorial choice was made.

Thereafter, for a period of 10 years, John E. Addicks vainly endeavored to have himself chosen for this office, a division of the Republican party being the result. The «Regulars» were opposed to Addicks and the Union Republicans were in favor of him. Four times senatorial vacancies occurred that left the State but one senator for five years and with none for two.

Finance.— A State capitation tax of 25 cents is imposed, but the receipts are chiefly from fees, licenses, inheritance taxes, special taxes on banks, railroads, etc. The assessed valuation of the State is (1918) $185,283,517. This valuation includes only real estate and live-stock — no other personal property.

Divisions and Population.— The State has three counties: New Castle, Kent, and Sussex. The first, including Wilmington, has about one-half of the entire population of the State. The counties are divided into «hundreds» instead of townships. There are incorporated cities and towns, of which Wilmington is the only large one, with a population (1918) of 110,000; (1900) 76,508, showing 43.7 per cent increase. Of the others the chief are Dover, the capital, slightly growing; New Castle, Milford, Lewes, and Smyrna. In Indian River hundred, Sussex County, there is a settlement of «white Indians» or «Moors,» descended, tradition says, from a band of Moors. A like body of Moors is found in Kent County, near Moorton, who came there direct from Spain in 1710, Scharf says in his History. The two settlements, which are decreasing, are probably identical. They do not associate with the colored race, intermarry and maintain separate schools and churches with the help of the State.

History.— Delaware represents the sole attempt of Sweden to seize its share of America. It does not take its name from the Indians who inhabited it, but from the river and bay, named by the English after Lord de la Warr (Sir Thomas West), who, tradition says, anchored in the bay in 1610; the Dutch called the river «South River» as distinguished from the «North River,» the Hudson. The first settlement actually made in Delaware was by the Dutch trader Peter Heyes in April 1631, on the creek near the present Lewes; he called it Hoornkill, or Hoorn Creek («Kill» Dutch for creek), in honor of Hoorn, the home of De Vries who visited the Delaware in 1632. The story that seeks to explain the corruption of the name Hoornkill to Whorekill has no historical truth whatever. Giles Hossett, whom Heyes left in command of this «Zwaanendael» («Valley of Swans») colony — so called from the number of swans there — fell out with the Indians, who slaughtered the whole settlement of about 30 persons and burned their little fort, Oplandt. This brief little settlement defeated Lord Baltimore's claim to the western half of this peninsula. Out of its ashes arose the present State of Delaware. In 1637 Axel Oxenstiern, the great Swedish Minister of Gustavus Adolphus, revived his dead master's pious plan of founding a Swedish West India Company and sent Peter Minuit, the ex-director-general of New Netherlands, with a mixed Swedish and Dutch expedition to seize and settle a point on the coast. Minuit landed April 1638, choosing the peninsula where Wilmington now stands, about two miles back from the river; he called the creek «the Elbe,» and built a fort which he named Christina, after the girl-queen of Sweden, Gustavus' daughter. The creek later was given that name, now changed to Christiana. The entire domain he called New Sweden. The Dutch protested, but as their company had to pay its own war bills they did no more, and in 1640 the Swedish government sent another body of colonists. More Dutch came also and settled some miles below; the stockholders of the enterprise were partly in Holland and partly in Sweden, and each party sent its own countrymen. The Swedish settlements were vigorous for a while and spread rapidly, colonizing New Gottenburg at Tinicum Island and Upland near by, driving a New Haven English colony off Salem Creek in New Jersey and keeping the place themselves, with a fort called Elsenburg. In 1646 the Dutch built a block-house on the site of Philadelphia, opposite Fort Nassau built by them in 1623; the Swedish governor, Printz, marched there and pulled it down. But when Stuyvesant came to New Netherlands in 1647 he was under orders to fight, and in 1651 built Fort Casimir on the site of New Castle, blocking the Delaware to the Swedes. Rising, Printz's successor, attacked and captured it in 1654 and changed the name to Trinity. Stuyvesant came down in 1655 with a large force, captured not only Trinity but Christina, deported the officers to New Amsterdam and forced the rest to swear allegiance to New Netherlands or leave the country. Trinity was renamed New Amstel. The Swedish rule was now ended, but the Swedish blood remained, as many family names still attest, and made a worthy part of that mixed strain of blood, English with a very little Dutch, which composes the population of the State. Between 1631 and 1656 10 expeditions were sent out by the Swedish government and, according to a census taken by Rising in 1654, there were 368 persons, Swedes and Dutch, on the Delaware.

When the Duke of York took New Amsterdam from the Dutch in 1664 the Delaware settlements went with it, and New Amstel was renamed New Castle. When the Dutch retook New York in 1673 there was a renewed Dutch rule on the Delaware, which, however, lasted but one year, Delaware and New York being restored to England by the Treaty of Westminster, 1674. On 24 Aug. 1682, by a supplemental deed from the Duke of York, William Penn acquired the whole country comprising the present State of Delaware. There were at that time about 3,500 people «in the province of Pennsylvania, and territories and on the eastern bank of the Delaware from Trenton to Salem»; 7,000 in 1684 in the province alone. The people from the earliest settlements were successively governed by Swedish, Dutch and English rulers, with few or no legislative powers until Penn's time, when a pretense of granting such was made by him. It is, indeed, a strange anomaly that a good man who from his Newgate cell penned works on liberty of conscience worthy to rank with Milton's 'Areopagitica,' or other like classics of human liberty, could have originated so autocratic a system of government as his Upland Code of 1682, which was, in fact, an utter denial of all self-government! But, despite this, the people gradually won the right of self-government, till, upon their separation in 1776 from Pennsylvania, «the three counties upon the Delaware,» as they had been styled, assumed the full power of autonomy under the name of the «State of Delaware.» The century-long title dispute with the Baltimores was settled in 1768. The lower river settlements were first governed as part of Pennsylvania, sending six representatives each to its legislature; but there was no community of interests or feelings between the two sections; quarrels were frequent and in 1691 the three counties seceded and for two years there was a dual government. In 1703 they were granted a separate legislature, which met at New Castle and the two sections continued more peaceably together, having one council and governor, till the Revolution. In the Continental Congress the colony was separately represented as the «Three Lower Counties on the Delaware.» These counties were originally known as New Castle, Jones and Whorekill or Deal, but Penn changed them — Deal to Sussex and Jones to Kent. On 21 September a convention at New Castle adopted a State constitution, in which the three counties were called «The Delaware State.» John McKinley was elected its first president or governor in 1777. It was the first (7 December) to ratify the national Constitution. In 1792 it adopted a new constitution; in 1831 a third and in 1897 the present one.

Delaware was a slave-holding State during the Civil War, and a large number of its people, especially in Kent and Sussex counties, warmly sympathized with the South, but even there a deep reverence for the Constitution and a devotion to the Union was felt. But the large preponderance of population and wealth in New Castle, together with the courageous loyalty of its war governor, William Cannon, kept the State from secession. Still, had the buffer State of Maryland seceded, it is possible Delaware would also have done so. On 2 Jan. 1861, the house unanimously, and the senate by a majority, voted «unqualified disapproval» of a solicitation to secede, made in person by Henry Dickinson, a commissioner from Mississippi. The call for Union troops was answered so quickly and fully that Lincoln said in his message of 3 Dec. 1861, «Noble little Delaware led off right from the first.» The records of the War Department show that out of its entire male population of 59,689 — of which nearly one-sixth were blacks — it furnished 13,651 troops — a proportion probably not equaled by any other State. If to this be added the hundreds who entered the Southern army, it would amount to about one-fourth of all the males! In this it kept good its unequaled record of 1776, when out of a population of 37,219 it gave 4,728 to the cause of the Revolution, besides several hundred militia. During the Reconstruction period, however, the legislative majority sympathized with the South, and by large majorities in both branches voted against the Fourteenth and Fifteenth amendments. Delaware and Kentucky never ratified the Thirteenth Amendment. The leading element in State politics since 1850 has been the «Peace Democrats,» devoted to the Union but opposed to coercion of the States, as exemplified in the Bayard family (see BAYARD, JAMES A. 2d, and THOMAS F.). The Democratic majority was always small, except in 1878 when the Republican party was temporarily ruined by joining the Greenback-Labor party.

The American Flag was first unfurled on land in the fight at Cooch's Bridge, Del. 3 Sept. 1777; a handsome monument marks the spot. George Read, «The Signer,» as he is styled in Delaware annals, shares with one other the unique distinction of having signed all the three great charters of the Nation's freedom, viz., the first petition of the Congress of 1774 to the king, the Declaration of Independence and the Constitution of the United States. The nickname, «The Blue Hen's Chickens,» for the people of Delaware, was first given to the Revolutionary soldiers of Captain Caldwell, famous for their dash and grit, either because of the prize fighting cocks (chickens of a certain «blue hen») he carried with him, or from their blue uniforms. Tradition says their flag also bore the inscription.

The early colonizers or governors of New Castle, Kent and Sussex counties, prior to Delaware statehood, were as follows:

DUTCH RULE	
Cornelius Jacobsen Mey	1624–1625
William Verhulst	1625–1626
Peter Minuit	1625–1632
Wouter Van Twiller	1633–1638
SWEDISH RULE	
Peter Minuit	1638–1640
Peter Hollandaer	1640–1643
John Printz	1643–1653
DUTCH RULE	
Peter Stuyvesant	1647–1653
SWEDISH RULE	
John Pappegoya	1653–1654
John Claude Rysing	1654–1655
DUTCH RULE	
Peter Stuyvesant	1655–1664
Dirk Smidt	Vice-Directors
John Paul Jacquet	
Andreas Hudde	
Gregorius Van Dyck	
William Beekman	
Alexander Hinoyossa	
ENGLISH RULE	
Richard Nichols	1664–1664
Robert Needham	1664–1667
Francis Lovelace	1667–1668
John Carr	1668–1673
DUTCH RULE	
Anthony Colve	1673–1673
Peter Alrichs	1673–1674
ENGLISH RULE	
Edmond Andros	1674–1674
Edmund Cantwell	1674–1676
John Collier	1676–1677
Christopher Billop	1677–1681
Anthony Brockholst	1681–1681

Under William Penn, proprietor, 1681–1718, twenty-six representatives of Penn ruled up to 1704 when the three counties, New Castle, Kent and Sussex seceded and set up their own local government, merely acknowledging the authority of the Provincial governor of Pennsylvania. Thereafter, 13 such Provincial governors represented William Penn till his death in 1718, and his three sons as Proprietors up to 1776, when the three counties separated from Pennsylvania and became the autonomous State of Delaware.

PRESIDENTS UNDER THE CONSTITUTION OF 1776

John McKinley, 21 Feb. 1777, captured by the British 11 Sept. 1777.

Thomas McKean, acting	12 Sept. 1777	to	20 Oct. 1777
George Read, acting	20 Oct. 1777	to	20 March 1778
Caesar Rodney, Pres	20 March 1778	to	13 Nov. 1781
John Dickinson	13 Nov. 1781	to	4 Nov. 1782
John Cook, acting	4 Nov. 1782	to	8 Feb. 1783
Nicholas Van Dyke	8 Feb. 1783	to	27 Oct. 1786
Thomas Collins	27 Oct. 1786	to	29 March 1789
Jehu Davis, acting	29 March 1789	to	30 May 1789
Joshua Clayton	30 May 1789	to	13 Jan. 1793

GOVERNORS UNDER THE CONSTITUTION OF 1792

Joshua Clayton, Federalist	Jan. 1793	to	Jan. 1796
Gunning Bedford, Federalist	Jan. 1796	to	28 Sept. 1797
Daniel Rogers, acting, Federalist	28 Sept. 1797	to	Jan. 1799
Richard Bassett, Federalist	Jan. 1799	to	March, 1801
James Sykes, act., Federalist	March 1801	to	Jan. 1802
David Hall, Federalist	Jan. 1802	to	Jan. 1805
Nathaniel Mitchell, Federalist	Jan. 1805	to	Jan. 1808
George Truitt, Federalist	Jan. 1808	to	Jan. 1811
Joseph Haslet, Federalist	Jan. 1811	to	Jan. 1814
Daniel Rodney, Federalist	Jan. 1814	to	Jan. 1817
John Clark, Federalist	Jan. 1817	to	Jan. 1820
Jacob Stout, acting, Federalist	Jan. 1820	to	Jan. 1821
John Collins, Dem.-Rep	Jan. 1821	to	April 1822
Caleb Rodney, act., Dem.-Rep.	April 1822	to	Jan. 1823
Joseph Haslet, Dem.-Rep	Jan. 1823	to	20 June 1823
Charles Thomas, acting Dem.-Rep,	20 June 1823	to	Jan. 1824
Samuel Paynter, Federalist	Jan. 1824	to	Jan. 1827
Charles Polk, Federalist	Jan. 1827	to	Jan. 1830
David Hazzard, Federalist	Jan. 1830	to	Jan. 1833

GOVERNORS UNDER THE CONSTITUTION OF 1832

Caleb P. Bennett, Amer. Rep.	Jan. 1833	to	9 April 1836
Charles Polk, acting, Amer. Rep.	April 9, 1836	to	Jan. 1837
Cornelius P. Comegys, Whig	Jan. 1837	to	Jan. 1841
William B. Cooper, Whig	Jan. 1841	to	Jan. 1845
Thomas Stockton, Whig	Jan. 1845	to	2 March 1846
Joseph Maull, acting, Whig	2 March 1846	to	1 May 1846
William Temple, acting, Whig	1 May 1846	to	Jan. 1847
William Tharp, Dem	Jan. 1847	to	Jan. 1851
William H. Ross, Dem	Jan. 1851	to	Jan. 1855
Peter F. Causey, Whig	Jan. 1855	to	Jan. 1859
William Burton, Dem	Jan. 1859	to	Jan. 1863
William Cannon, Rep	Jan. 1863	to	1 March 1865
Gove Saulsbury, acting, Dem.	1 March 1865	to	Jan. 1867
Gove Saulsbury, Dem	Jan. 1867	to	Jan. 1871
James Ponder, Dem	Jan. 1871	to	Jan. 1875
John P. Cochran, Dem	Jan. 1875	to	Jan. 1879
John W. Hall, Dem	Jan. 1879	to	Jan. 1883
Charles C. Stockley, Dem	Jan. 1883	to	Jan. 1887
Benjamin T. Biggs, Dem	Jan. 1887	to	Jan. 1891
Robert J. Reynolds, Dem	Jan. 1891	to	Jan. 1895
Joshua H. Marvel, Rep	Jan. 1865	to	8 April 1895
William T. Watson, acting, Dem,	8 April 1895	to	Jan. 1897
Ebe W. Tunnell, Dem	Jan. 1897	to	Jan. 1901

GOVERNORS UNDER THE CONSTITUTION OF 1897

John Hunn, Rep	Jan. 1901	to	Jan. 1905
Preston Lea, Rep	Jan. 1905	to	Jan. 1909
Simeon S. Pennewill, Rep	Jan. 1909	to	Jan. 1913
Charles R. Miller, Rep	Jan. 1913	to	Jan. 1917
John G. Townsend, Jr., Rep	Jan. 1917	to	

WILLIAM E. WRIGHT,
Editor, Middletown, Del., Transcript.

DELAWARE, Ohio, city and county-seat of Delaware County; on the Whetstone (Olentangy) River, and on branches of the Cleveland, Cincinnati, Chicago and Saint Louis, the Pennsylvania and several other railroads, 24 miles north of Columbus. It is the trade centre of Delaware and surrounding counties, and has manufactures of iron, flour, woolens, lumber, furniture, agricultural implements, chairs, carriages, cigars, gasoline engines, etc. It is the seat of Ohio Wesleyan University and the Ohio Wesleyan Female College. The former is a coeducational college which was organized in 1842. Part of its work is at Columbus, also. It contains a Carnegie library and was the birthplace of Rutherford B. Hayes. There are sulphur, magnesia and other mineral springs nearby, and the city has large railroad repair shops, hotels, daily and weekly newspapers, and two national banks. Delaware, incorporated in 1827, is governed by a mayor elected every two years, and a municipal council. Pop. 9,076.

DELAWARE BAY, a large bay or arm of the sea, between the States of Delaware and New Jersey. The Delaware River and several small streams flow into this bay. It is 65 miles long, and in the centre about 30 miles across, and about 15 miles at its mouth, from Cape Henlopen to Cape May. At the entrance to this bay, near Cape Henlopen, is situated the Delaware Breakwater, the object of which is to afford vessels a shelter within the cape. The breakwater proper is 1,200 yards in length, and runs in a straight line from east-southeast to west-northwest, leaving an entrance 650 yards wide between its east end and the north point of the cape. It serves also as an ice-break against the floating ice which sometimes comes down the bay. At the distance of 350 yards from the upper or western end of the breakwater a similar dike, of 500 yards in length, is projected so as to form an angle of 146 degrees 15 minutes with the breakwater. Government lighthouses are stationed at the entrance, to indicate shoal places in the channel and breakers along the shore. The dividing line between Delaware and and New Jersey runs northwest and southwest through the centre of Delaware Bay and up the Delaware River. The bay is a broad open watercourse to Wilmington, the most populous city of Delaware, and beyond Wilmington, to the north, on the Delaware River, to Philadelphia and Camden, two of the largest shipping ports on the Atlantic Coast.

DELAWARE COLLEGE, an institution founded at Newark, Del., 1833, closed in 1859. In 1870 it was reopened as a «Land Grant College,» the State of Delaware appropriating funds received under the Land Grant Act of 1862. Further aid received from the State funds obtained under the congressional act called the «Hatch Bill» enabled the college to open an agricultural experiment station in 1887. A still further grant was received under the act of 1890. The college began to receive an annual appropriation of $40,000 in 1897, under the terms of the Nelson bill which was enacted in that year. Until 1913 the charter was renewable every 20 years but in that year by act of the legislature it was made permanent. In 1913–18 the college received a State appropriation of $150,000, paid in five instalments for the erection of buildings and plant to house a woman's college, which in the main is a distinct institution from Delaware College, but for certain purposes of State administration they are coordinated. The library contains about 20,500 volumes; there are 232 students and 31 instructors. The college is non-sectarian; its property is valued at $400,000 and its total income, including tuition or incidental charges, is $97,-

480. The cost of tuition is $60 per annum; while the student's living expenses are from $175 to $275 a year, with additional expenses (fees, books, etc.) of $75 to $100.

DELAWARE & HUDSON RAILROAD.

The Delaware and Hudson Railroad system is the outcome of a series of amalgamations of many small lines leased and constructed from time to time by the Delaware and Hudson Canal Company, which was chartered under the laws of the State of New York in 1823 as a coal mining and transportation corporation. The State also loaned its credit of $500,000 to aid in the construction of a canal from Honesdale, Pa., across the Delaware River to Rondout, N. Y. (now a part of the city of Kingston) on the Hudson River, hence the name, «Delaware and Hudson.» The canal was completed in 1828 with capacity for boats carrying 25 tons. It was enlarged in 1844 for 40-ton boats and again in 1862 for boats of 125 to 150 tons capacity. It was finally abandoned in 1899, with the consent of the State. The rail lines of the Delaware and Hudson Company extend from Wilkesbarre, Pa., to Rouse's Point on the Canadian boundary, with branches to Binghamton and Troy, N. Y., Rutland, Vt., Lake George and Lake Placid, and some lesser points. In the number and variety of its summer resorts this railroad occupies a unique position, touching Cooperstown, Sharon Springs, Round Lake, Saratoga Springs, the Lake George and Lake Champlain resorts, and the eastern gateways into the Adirondack Mountains.

The total mileage operated on 30 June 1916 was 885.63 miles, of which 352.26 miles were owned by the company, and the remainder leased or controlled under trackage rights. The operating revenues for the fiscal year ended 30 June 1916 were $25,933,675, earned by the transportation of 7,459,533 passengers and 22,623,328 tons of freight. The individual passenger travel averaged 17.4 miles at a charge of 2.2 cents per mile, aggregating 443,297,189 miles and $2,860,283. The freight traffic averaged 145.31 miles per ton, at a charge of 0.658 cents per ton per mile, aggregating 1,414,674,323 ton-miles and $21,631,350. The operating expenses were $16,381,569. After deducting taxes, etc., the total operating income was $8,912,868. Rents for leased roads amounted to $2,006,142, and interest on the funded debt was $2,712,833. The net income, which was transferred to profit and loss, was $4,769,972. The dividend appropriation from surplus was $3,825,234.

The equipment of the road on 30 June 1916 consisted of 488 locomotives with an aggregate tractive capacity of 18,274,250 tons, 246 passenger cars, and 18,818 freight cars, of which 11,431 are coal cars with an aggregate capacity of 463,401 tons. By far the largest freight tonnage of the railroad is coal, amounting in the year quoted to 12,567,166 tons, or 56 per cent of all the freight handled.

The entire investment in road and equipment on 30 June 1916 totaled $68,642,658. Other investments, including $6,645,026 in coal lands, amounted to $63,103,256. The total long term debt amounted to $62,798,000, and the credit balance of the profit and loss account was $18,489,610.

In 1915 the company mined 8,100,767 tons of anthracite coal, which was sold under contract at the pit mouth to the Hudson Coal Company for $15,860,677.

The Delaware and Hudson system includes 333.79 miles of electric lines, embracing the United Traction Company, operating in the cities of Albany, Rensselaer, Troy, Watervliet, Cohoes, Waterford, etc.; the Hudson Valley Railway Company, operating from Waterford to Warrensburgh and Glens Falls to Mechanicsville; the Schenectady Railway Company, operating in the counties of Schenectady, Albany and Saratoga; and other lines in Troy and Plattsburgh, N. Y. The company also owns (in connection with the Rensselaer and Saratoga Railroad) and operates two fleets of passenger steamers, one on Lake Champlain and the other on Lake George. The regular routes of the Champlain steamers total 159 miles and their excursion routes 112 miles. The route of the Lake George steamers is 38 miles. An interesting event in the history of the company is the fact that the first steam locomotive ever placed on a railroad in the western hemisphere, «The Stourbridge Lion,» made its trial trip on the Delaware and Hudson Railroad, between Carbondale and Seeleyville, on 8 Aug. 1829. The locomotive was built by Foster Roswick & Company, of Stourbridge, England. It arrived in New York in May 1829. It was of the grasshopper type with walking beams and vertical cylinders. The locomotive and the tender were each four-wheeled, with spokes and felloes of wood, iron tires and wheel centres. The track on which it ran was of strap iron spiked next the inner edge to large hemlock sleepers laid on cross ties. The Delaware and Hudson Railroad system in 1916 included the Albany and Susquehanna Railroad; the Chateaugay and Lake Placid Railroad; the Cooperstown and Charlotte Valley Railroad; the Cooperstown and Susquehanna Valley Railroad; the Rensselaer and Saratoga Railroad; the Albany and Vermont Railroad; the Rutland and Whitehall Railroad; the Saratoga and Schenectady Railroad; the Ticonderoga Railroad; the Greenwich and Johnsonville Railway; the Napierville Junction Railway; the Northern Coal and Iron Company; the Quebec, Montreal and Southern Railway; and the Schoharie Valley Railway.

DELAWARE INDIANS (their own name Renno Renappi, or Lenno Lenape, «true men»; cf. Illinois, Innuit, Lokono, Muysca, Alemanni, etc.), an important Algonquin tribe which lay in the path of white settlement on both sides of the Delaware River, and therefore fills a large place in colonial history. Previously they had been subjugated by the Iroquois, who, instead of exterminating or absorbing them, exacted tribute, called them «women,» and dictated their action. The early Dutch settlers were massacred as usual; but the Swedes on the Delaware upheld Indian titles to land to secure their own possession against the Dutch, compelling the latter in turn to buy instead of seizing, so there was peace with the Delawares in this period. The Swedes tried to christianize them with Luther's catechism, without much success. In October 1682, Penn made his famous treaty with them, as well and as ill kept by his successors as others of the kind; that the Delawares did not revenge the white encroachments by massacre was due to Penn's sagacity in buying up their overlords, the Iroquois, who threatened to destroy them if they molested «Onas'» people. The infamous trick of the «Walking Purchase» (q.v.) in 1737 (denounced by the Quakers) ousted them from half a million acres in the forks of the Delaware above Easton, and the Iroquois with furious menaces compelled them to retire to the Susquehanna. Here settlement pursued them, and not daring to resent it, a large part of them by 1750 had removed to the Alleghany and Muskingum, where they recovered Indian courage and ferocity. The Moravian missionaries converted part of the remainder, and these always remained peaceful. The others, maddened by aggression, joined the French and Iroquois in the French and Indian war, and helped in Braddock's defeat; sullenly yielding in 1758, after the Senecas had turned against them, they broke out again in Pontiac's Conspiracy (q.v.) of 1762, and were among the besiegers of Detroit, Fort Pitt, Duquesne, etc. Defeated by Bouquet at Bushy Run, 1763, they made peace in 1764–65. In 1768 all the remnants east of the Alleghanies migrated west; and the Christian Delawares founded the village of Gnadenhütten on the Muskingum. Roving bands of the others kept the field till the crushing defeat of Point Pleasant (q.v.), 1774. In the Revolution they were divided; part went with the English, part made a treaty with Congress in 1778. The Christians remained quietly at Gnadenhütten, till in 1781 the English broke it up and removed them to Sandusky. Part of them returned thither to save their crops, and were attacked by the Americans and 90 of them murdered; the rest fled mostly to Canada. Land was given them on the Thames, and they founded Fairfield, with others who came in 1787 from the Muskingum, where Congress had settled them. The wild tribesmen remained hostile, and contributed to St. Clair's defeat in 1791; but Wayne's victory forced them to make peace in 1795. Successive treaties removed them from Ohio, and by 1800 the main body were on White River, Indiana. They did not join Tecumseh in the War of 1812, and in 1818 they ceded all their lands east of the Mississippi and moved to White River, Missouri. There were then 1,800 in all, a few remaining in Ohio. Later, some went south to Red River, on the Texan border, by Spanish permission. By treaty of 24 Oct. 1829 the main body, about 1,000, settled on the Kansas and Missouri. They had schools and missions. In 1853 they sold all but a reservation in Kansas, invested the moneys sagaciously, and built fair houses, improved their farms, etc. During the Civil War, out of 201 warriors they sent 170 to the Union side, who proved good soldiers and guides. In 1866 their land was cut up by the Union Pacific Railroad, and they sold the whole in 1867–68, and took up lands on the Verdigris and Cane, bought from the Cherokees. A special treaty of 1866 permitted them to take lands in severalty and become citizens; they did so, and are not a «tribe» any longer, though they form a part of the «Cherokee Nation» in Oklahoma, numbering now 914. There are other bands, which in all make more than 780. The had three clans, the Turtle, Turkey and Wolf or Munsee (q.v.); the latter, differing strongly from the rest, is in three divisions, — 71 on the Thames in Canada, about 200 at Green Bay, Wis., with the Stockbridges, and some with the Chippewa in Kansas. There are also some on Grand River reserve in Ontario, and about 350 Moravians on the Thames. Consult Harrington in *American Anthropologist* (1913) and Skinner, 'Report of the Archæological Survey of New Jersey' (1913).

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY, The, is a consolidation of a number of short railroads originally separate corporations. It was chartered under the laws of Pennsylvania in 1849 as the Ligetts Gap Railroad. This name was changed in 1851 to the Lackawanna and Western Railroad. In 1853 a consolidation was effected with the Delaware and Cobbs Gap Railroad chartered but not yet built, and the present name was then adopted. The system as now operated extends from the seaboard at New York to the Great Lakes at Buffalo, traversing New Jersey, Pennsylvania and southern and western New York, with branches into the slate and cement regions of Pennsylvania and New Jersey, the anthracite fields of Pennsylvania, and the agricultural, dairy and industrial area of central New York.

The total mileage operated on 30 June 1916 was 955.06 miles, of which 236.12 miles were owned by the company, and the remainder held under leases and trackage rights. The operating revenues for the fiscal year ended 30 June 1916 were $49,335,739, earned by the transportation of 24,756,837 passengers and 26,458,931 tons of freight. The individual passenger travel averaged 21.83 miles at a charge of 1.566 cents per mile — aggregating in the year 540,372,771 miles, and $8,462,493. The freight traffic averaged 189.35 miles per ton, at a charge of 0.719 cents per ton-mile — aggregating in the year 5,010,072,493 ton-miles, and $36,034,113. The operating expenses for the year were $29,511,905. After deducting taxes, etc., the total operating income was $17,609,604. Rentals for leased roads amounted to $5,960,196. The total net income from all sources was $14,289,516, of which $8,444,080 was appropriated for dividends; $2,056,742 for physical betterments; and a balance of $3,788,694 transferred to profit and loss.

The equipment of the road on 30 June 1916 consisted of 733 locomotives with an aggregate tractive capacity of 23,438,100 tons, 535 passenger cars; and 27,812 freight cars, of which 11,452 were coal cars with an aggregate capacity of 451,110 tons. By far the largest freight tonnage of the road is coal, amounting in the year cited to 12,200,415 tons, or 46 per cent of all the freight handled.

The entire investment in the road and its equipment on 30 June 1916 was $68,656,640. Other investments of the company amounted to $71,314,561. The total stock outstanding on the date mentioned was $42,291,120, and the total long term debt was $102,600. The credit balance of the profit and loss account was $43,644,436.

The company owns extensive anthracite coal lands in Lackawanna and Luzerne counties, Pa. Under the decision of the United States Supreme Court the railroad discontinued its coal business in 1909, and this was taken over by the Delaware, Lackawanna and Western Coal Company. The latter sold in 1915 9,113,144 tons of coal, valued at the mines at $22,726,155.

The railroad owns and operates the New

York and Hoboken Ferry, connecting the city of New York with Hoboken, N. J.

The present «Lackawanna Railroad» as it is popularly called includes as its oldest component the Ithaca and Owego Railroad, chartered in 1828, completed in 1834. For six years this road was operated by horse power and stationary engines, the company having no locomotives until 1840. Other railroads now a part of the system are the Morris and Essex Railroad; the Newark and Bloomfield Railroad; the Sussex Railroad; the Chester Railroad; the Passaic and Delaware Railroad; the Warren Railroad; the Oswego and Syracuse Railroad; the Syracuse and Binghamton Railroad; the Utica, Chenango and Susquehanna Railroad; the Valley Railroad; the New York, Lackawanna and Western Railroad; the Bangor and Portland Railroad; and the Erie and Central New York Railroad. An interesting incident in its history relates to the efforts of the railroad to induce the public to use anthracite coal as fuel, many carloads being given away in the early 50s to those who would agree to try it.

DELAWARE RIVER, a river of the United States. Its main fork takes its rise in a little lake of Schoharie County, N. Y., on the slopes of the Catskill Range and at an elevation of almost 2,000 feet. This branch takes a southwestern course to Deposit, about 100 miles distant, whence it flows southeast and becomes the boundary line between the States of New York and Pennsylvania. The lesser or eastern fork also takes its rise in the Catskills and flows into the main branch at Hancock. After leaving Port Jervis, N. Y., it divides the States of New Jersey and Pennsylvania, flowing in a southerly direction through the famous Delaware Water Gap, to Easton, Pa. Its course is now southeast to Trenton, N. J., whence it turns southwest and flows past the great cities of Chester and Philadelphia. Below Chester it gradually widens into Delaware Bay. Its extreme length including the bay and estuary is 410 miles, of which the bay takes up about 50. The total area of the watershed of the Delaware is 12,012 square miles, of which 3,000 miles are in New York, 2,500 in New Jersey and over 6,000 in Pennsylvania. Along its course are considerable waterfalls which are extensively used for power purposes; among these are Welles's Falls at Lambertville, about 15 feet, the Foul Rift of 23 feet at Belvidere and the 30-foot fall at Port Jervis, N. Y. In New York it receives the waters of the Mongaup and Neversink, in New Jersey the Musconetcong and Maurice, and in Pennsylvania the Lackawaxen, Lehigh and Schulykill. Ocean-going vessels ascend the Delaware to Philadelphia and vessels of lighter draught to Trenton. From Easton to a point opposite Trenton its course is paralleled by a canal. Other canals linking it with great waterways are one to the Raritan River, connecting New Brunswick and Trenton, and one to the Hudson River, from Phillipsburg to Jersey City, N. J. The river was first explored in 1609 by Hendrik Hudson, and in 1615–16 by Cornelius Hendrikson, and their reports led to the organization of the Dutch West India Company.

DELAWARE WATER GAP, Pa., village in Monroe County, on the Delaware River and the Delaware Lackawanna and Western and the New York, Susquehanna and Western railroads, near Stroudsburg, Pa., 65 miles northeast of New York. The Delaware River, where it passes through the Kittatinny Range of the Appalachian Mountains, forms a gorge about three miles in length and above the water the sides rise to the height of 1,400 feet. Its great scenic beauty attracts annually a considerable number of tourists and vacationists.

DELAWARR, or **DELAWARE, Thomas West.** See West, Thomas, Lord Delawarr, or Delaware.

DELBRÜCK, dĕl'brük, **Hans,** German historian of military science: b. Bergen, Rügen, 1848. He was educated in Heidelberg, Bonn and Greifswald. He was an officer in the Franco-Prussian War and in 1874 became tutor to Prince Waldemar. He was a member of the Reichstag in 1882–83 and 1884–90 and after 1883 was on the editorial staff of the *Preussiche Jährbücher*. He was appointed professor of modern history at the University of Berlin in 1885. He has written several important works on the art of war as practised within historic times. The more important of his works are 'Die Perserkriege und die Burgunderkriege' (1887); 'Die Strategie des Perikles erlaütert durch die Strategie Friedrichs des Grossen' (1890); 'Friedrich, Napoleon, Moltke, Aeltere und Neure Strategie' (1892); 'Geschichte der Kriegskunst im Rahmen der politischen Geschichte' (3 vols., 1900–07); 'Erinnerungen, Aufsätze und Reden' (1902).

DELBRÜCK, Martin Friedrich Rudolf von, German statesman: b. Berlin, 16 April 1817; d. there 1903. He was educated at Halle, Bonn and Berlin. Entering public life in 1849 he was finally made director of the Department of Commerce and Industry (1859); and his part in detaching Prussia from the Austrian commercial policy was considerable. After 1862 Bismarck, then president of the Cabinet, supported von Delbrück's commercial ideas and on the same principles he negotiated treaties with foreign powers. In 1867 Delbrück was made president of the Imperial Chancellory of the North German Federation. In 1870 he negotiated the treaties which made Germany a unit. For five years after the founding of the Empire, Delbrück retained his office as president of the General Chancellory, now become the Imperial Chancellory. In 1876 he was dismissed in spite of his reputation and service. Later, as a member of the Reichstag, he dared oppose Bismarck. He retired from the Reichstag in 1881. In 1896 he received the order of the Black Eagle at the hands of the emperor. He published 'Der Zollverein und das Tabaksmonopol' (1857); 'Der Artikel 46 der Reichsverfassung.'

DELCASSÉ, dĕl-kä'sā, **Théophile,** French editor and statesman: b. Pamiers, Ariège, France, 1 March 1852. For some time on the staff of *La République Française* and was elected deputy from Foix 1889 and re-elected 1893 and 1898. He was under-Secretary of State for the colonies and became Minister for the Colonies in 1894. He was Minister of Foreign Affairs in Brisson's Cabinet, holding the same office under Dupuy, Waldeck-Rousseau and Combes. He settled the «Fashoda Affair» with England and gave an eastern frontier to the possessions of France in Africa. He also concluded a commercial convention with the United States. Owing to disapproval of his Moroccan policy, on 6 June 1905 he resigned his post as Minister of Foreign Affairs. In the following May he again became a member of the Chamber of Deputies and in 1909 was appointed chairman of a committee of deputies appointed to investigate various matters in connection with the navy. The report of this committee, when presented to the Chamber, drew an attack on Delcassé from Georges Clemenceau, the Premier. Delcassé, saw his naval plans adopted in 1910, and held the portfolio of Minister of Marine under Monis, March–June 1911, and in the cabinets of Caillaux and Poincaré in 1911–12. In January of the latter year he became Minister of Foreign Affairs. In 1913 he was sent to Saint Petersburg on a temporary mission. He was again Minister of Foreign Affairs in 1914, retaining his portfolio until October 1915.

DEL CREDERE, dĕl krĕd'ĕ-rĕ, an Italian mercantile phrase expressing a guarantee or warranty, given by factors, brokers or mercantile agents, who, for an additional commission, become bound not only to transact business for their employers, but also to guarantee the solvency of the persons to whom the goods are sold, or with whom business is done. This additional commission is known as a del credere commission. The term has come into general use in international commerce, and is recognized in the common-law system of England and America.

DELEB PALM, the *Borassus Æthiopum,* a native of the interior and west of Africa, allied to and somewhat resembling the Palmyra palm (q.v.). Its leaves and fruits are used by the Africans for the same purposes as those of the Palmyra by the Asiatics, and the tender roots produced by the young plant are extensively used as an article of food. The trunk is swollen about halfway up.

DELECLUZE, dė-lā-klüz, **Etienne Jean,** French painter and critic: b. Paris, 20 Feb. 1781; d. Versailles, 12 July 1863. He was a pupil of David, and although achieving a fair success in painting he abandoned it for criticism 1816. He was connected with several reviews and papers, including the *Moniteur* and the *Journal des Débats,* and the *Revue des Deux Mondes,* being allied with the young literary circle of the Restoration. He also wrote several novels. Among his many works are 'Precis d'un traité de peinture' (1828); 'Mademoiselle Justine de Liron' (1832); 'Notice sur la vie et les ouvrages de Leopold Robert' (1838); 'Dona Olympia, the Sister-in-law of Pope Innocent X' (1842); 'Gregory VII, Saint François d'Assise and Saint Thomas d'Aquin' (1844); 'Louis David, son école et son temps' (1855); and 'Souvenirs de soixante années' (1862). In the museum at Versailles there are some curious pen and ink sketches by him of scenes of the invasion of Paris in 1814. Among his paintings are 'Mort de Astyanax'; 'Enlèvement d'Europe' (1808); 'Enlèvement d'Hélène par Paris' (1810); 'Un sacrifice à Cérès, Herminie et Tancrede' (1812); 'Auguste et Cinna' (1814).

DELEDDA, Grazia (Mrs. M. P. Lombard), Italian poetess and novelist: b. Nuoro, Sardinia, 1872. She owes her wide popularity to an impulsive originality in her portrayal of Sardinian life. Her first essays were accepted by Angelo De Gubernatis for his reviews, *Vita Italiana* and *Natura ed Arte.* Her first novel, 'Anime oneste,' received the honor of a graceful preface by Ruggiero Bonghi. Among her works, many of which have been translated into other languages, are 'Fior di Sardegna,' 'Racconti Sardi,' 'Amore regale,' 'La via del male,' 'Nostra Signora del Buon Consiglio,' 'Le tentazioni,' 'Il Vecchio della Montagna,' 'Dopo il Divorzio,' 'Il Tesoro,' 'Elias Portolu'— which is perhaps her best — and 'Nostalgie.' The main charm of her romances is described as "une certaine sauvagerie."

DELEGATE. See Delegation; Delegates, Court of.

DELEGATES, Court of, the old English court final of appeal, and was so-called because the judges thereof were delegated, by the king's commission under the great seal, to hear and determine appeals in the three following cases: (1) Where a sentence was given in any ecclesiastical cause, by the archbishop or his official; (2) when any sentence was given in any ecclesiastical cause in the places exempt; (3) when a sentence was given in the admirals' court, in suits civil and marine, by order of the civil law. This court has been abolished, and the privy council is now the great court of appeal in all ecclesiastical causes.

DELEGATION, a person or body of persons deputed to act for another. Before the present Constitution of the United States of America was adopted, the persons constituting the Congress at Philadelphia were called delegates, and the body of representatives of a State in Congress is still called the delegation of a State. In Maryland and Virginia the branch of the State legislatures which, in most of the other States, is called house of representatives, has the name of house of delegates. The name of delegate is also given to the representatives sent to the Congress of the United States from Territories not yet formed into States. In Italy branches of government are often called *delegazione,* and their members *delegati.* Formerly in Lombardy, Venice and the states of the Church the term *delegazione* was applied both to the governor and governing court of a province and to the province itself. The delegate was always a prelate, and directly appointed by the Pope. In the civil law, delegation is that act by which a debtor transfers to another person the duty to pay, or a creditor transfers to another person the right to receive payment.

DELENDA, dē-lĕn'da, things to be erased or expunged. *Delenda est Carthago* is the celebrated sentence with which Cato the elder was accustomed to conclude all his speeches in the Roman senate. His hatred of Carthage arose from a jealousy of its flourishing state, and the consequent danger to Rome.

DE LEON, Thomas Cooper, American author and playwright: b. Columbia, S. C., 21 May 1839; d. 19 March 1916. He was auditor Topographical Engineering Bureau, Washington, 1858–61, served in Confederate army 1861–65, and at the close of the war was connected with magazine and newspaper work in Baltimore, New York and Mobile. He organized the Mobile Mardi Gras Carnival and was its manager for 25 years, and has designed carnivals for many other cities for their various celebrations. Among his works are 'The Rock or the Rye'; 'Creole and Puritan'; 'A Fair Blockade Breaker'; 'The Puritan's Daughter'; 'Four Years in Rebel Capitals'; 'Out of the Sulphur'; 'A Bachelor's Box'; 'An Innocent Cheat'; 'Crag Nest'; 'Life of Joseph Wheeler'; and 'Confederate Memories.'

DELESCLUZE, dê-lā-klüz, Louis Charles, French communist: b. Dreux, 20 Oct. 1809; d. Paris, 28 May 1871. The February revolution opened to him a career in Paris, where his clever and facile pen quickly made him popular with the rabble, but earned him from the authorities imprisonment and a fine of 10,000 francs. Again at Paris in 1853, he was sentenced to two years' imprisonment, and was next transported to Cayenne, where he remained till 1859. He described his sufferings in 'De Paris à Cayenne: journal d'un transporté' (1867). After his return he was quiet for some years, until his journal, *Réveil,* started in 1868 to advocate the doctrines of the International, brought him into new trouble. In the history of the Paris Commune he played a prominent part, and upon his head rests in great part the guilt of the murder of the hostages, and the burning of the public buildings of the city. He died on the last barricade.

DELESSERT, dê-lĕs-sâr, Benjamin, French naturalist and philanthropist: b. Lyons, 14 Feb. 1773; d. Paris, 1 March 1847. In 1803 he started cotton-spinning in France, but is particularly distinguished by his efforts to produce beetroot sugar. As early as 1801 he was engaged in refining, but in 1806 he began the experiments which were successfully terminated and announced to Chaptal on 2 Jan. 1812. When he heard of it Napoleon was in ecstasies: "We must see it: let us go," he said. "Delessert," says Flourens, who narrates this incident, "had just time to go to Passy, where his work was. On his arrival he found the gates surrounded by the imperial chasseurs, who refused him admittance. He told them who he was and entered. The emperor had seen and admired everything; excitement was at its height. Approaching Delessert, the emperor took the cross of the Legion of Honor from his own breast and gave it to him." It was announced next day in the *Moniteur* "that a revolution in French commerce had been accomplished." Delessert lived through the collapse which the manufacture suffered after Napoleon's fall, and long enough to see it revive and become of the greatest importance.

DELFSHAVEN, or DELFTSHAVEN, the former being the modern form, once the haven or port of Delft, but now part of the city of Rotterdam, on the river Maas, and the starting point of the voyage of the Pilgrim Fathers to America, in 1620, and the birth place of Piet Hein, the Dutch admiral who in 1628 captured the West India Spanish plate fleet, with its cargo of $12,000,000 in silver. His statue is in the little park behind the historic edifice of the Reformed Church. The large island, which formed in the river Maas in front of the town, has been recently reclaimed to the main land, by filling the space occupied by the inner channel. In front, facing the river, is the Pilgrims' Avenue, or quay, named July 1892 in honor of the Separatists sailing for America. They spent the night before embarkation on the *Speedwell,* in the now greatly altered warehouse of the East India Company, the ship sailing 22 July. After the revival of interest in Pilgrim history, a stone from this edifice was, with one from Scrooby, England, and another from Plymouth, Mass., set in the facade of the New England Congregational Church in Chicago. After the great fire, in which this handsome edifice was gutted, the three stones remained intact. Three large dykes defend Delfshaven from the water, and here, in 1574, these were cut to flood the country and relieve Leyden. Two hundred "Cannon boats," loaded with herrings and bread, moved up the flood and raised the siege. The arms of Delfshaven contain representatives of green fields and white waters, in alternate strips, with herrings and wheat. In the river Schie which from Leyden and Delft has for centuries been made into a canal and flowing through D., the Pilgrim boats were moored. On 28 Sept. 1906, in celebration of the 300th anniversary of the sailing of the first Pilgrim company — others followed — a bronze tablet, presented by the Boston Congregational Club and set in the south wall, was unveiled in the Reformed Church, before an international audience. In the Consistory Room of this church, formerly a cloister chapel built in 1416, is kept a registry book for the Americans and others who visit the place. On the north wall, is a stone from Chicago with a Greek inscription. In 1915, a storm destroyed several of the larger windows and the Dutch congregation replaced the same in stained glass, with two splendid memorial designs in celebration of the "rocking the cradle of a great nation." Other companies of Pilgrims from Leyden sailed later from this port. A picture, painted by one of the Cuyps, father or son, discovered, in 1895, by George H. Boughton, probably depicts the actual scene of embarcation. The rotunda picture in the capitol at Washington, by Weir, showing luxurious costumes and imaginary hills in the background, was painted before the recovery of the Pilgrim story. Consult Griffis, 'The Pilgrims in Their Three Homes,' (1914).

William Elliot Griffis.

DELFT, or DELF, Holland, town in the province South Holland, six miles southeast of The Hague and eight miles northwest of Rotterdam. It stands on a dead flat, and is intersected in all directions by canals, which are crossed by 69 bridges, mostly of stone. These canals make the great market-place with its public buildings an island, approached by nine bridges. The counterscarps of the old ramparts are now planted with trees, and form public walks. The town-hall (*Stadhuis*), in the market-place, is a large, solid-looking building, with a heavy square tower rising from its roof. The Prinsenhof, once the occasional residence of William I of Orange, and the scene of his assassination (10 July 1584), is now a military barrack. The old Reformed church contains the monuments of Admirals Tromp and Hein, the famous naturalist Leeuwenhoek, and other worthies. The magnificent mausoleum of William, and the burial-place of the Orange family, are in the New Church (1412–76); and from its huge square tower the town and neighborhood are from time to time regaled with the richest music from a chime of three octaves; the New Church contains also the tomb of Hugo Grotius. Delft has long been the seat of an arsenal, and was formerly the centre of the manufacture of the kind of pottery called delftware or del, an industry now revived under the name of «New Delf.» The chief manufactures now carried on comprise firearms, carpets, leather, soap, oil and gin. Delft was founded in 1075 and received its charter in 1246. It was almost wholly consumed by fire in 1536; and in 1654 the powder magazine of the arsenal exploded accidentally, when not a single house entirely escaped, and many persons were killed or maimed. Pop. 34,485.

DELFT FAIENCE. To the Dutch town of Delft the world is indebted for a style in faience that has claimed the admiration of the world. When, at the beginning of the 17th century, the Dutch East India Company brought such large quantities of Chinese and Japanese porcelain ware they created a great rage for this beautiful «china.» The cost of this imported ware was, however, too high for most of the citizens. The rich Italian faience (majolica) had shown what fine effects were obtainable with oqaque tin enamels. Already the Dutch potters had been producing tin enameled tiles for decorating wall surfaces and for covering the surface of househeating apparatus (ovens). These tiles, with their quaint painted decoration consisting of biblical subjects, landscapes, ships, coats-of-arms, etc., had become popular all over Europe. By coating his darker clay body with white opaque tin enamel the Delft potter had found a method of creating an appearance of porcelain very pleasing to the eye. With the Chinese and Japanese porcelain pieces in such abundance before him he had forms and decoration in plenty to carry out a close imitation of equal variety and beauty. Starting at the very beginning of the 17th century, by 1680 this Delft faience was in such favor throughout the Continent and England that about 30 busy factories were in existence. Careful workmanship in potting and talented decoration produced a ware which is greatly admired by connoisseurs to the present day. The industry was continued till the end of the 18th century, when the cheap, handsome English «standard» formula «china» (see CERAMICS) flooded the European markets. Leading Delft makers and painters were Herman Pietersz, Van Frytom, A. Pynacker, L. Fictor, L. and S. Eenhorn, J. Van Brower, A. de Kooghe, Th. Witzenburgh, etc. Among the best known factories were The Metal Pot; the Double Jug; the Claw; the Peacock; the Porcelain Bottle; the Three Tuns; the New Moor's Head; the Two Little Ships; the Jug; the Two Savages.

Characteristics.— The thick, warm yet brilliant glaze of Delft faience contrasts favorably with the steely glitter of most Chinese porcelain. The white enamel background had a pure, though subdued, mellow tone.

Product.— Handsome «garnitures» for the chimney, consisting of a central gourd-shaped bottle, a beaker on either side, and at either end a jar with cover (all of Chinese form and decorative motifs), were favorites. Small vessels and beakers and small plates and brushbacks with bright-colored decoration and gold, on black or dark brown ground, are a much sought-for style. Other ornaments were cruets, candlesticks, scent bottles, bird cages, lanterns, sundials, flower holders, human and animal figures, etc. Peculiar forms were naturalistic violins, shoes and slippers for holding flowers, boxes of all sizes. Useful house services were made on a large scale.

Decoration.— Imitations of the Chinese blue-and-white decoration were made in largest profusion — A. de Keyser excelled in this. Gay colors alongside the blue followed. Japanese styles called «Imari» and «Japanese taste» were closely imitated from 1662. Many Oriental motifs were treated in a semi-European way (*chinoiseries*).

Glaze.— Delft ware is coated with a very thick, soft glaze.

Paste.— The body runs from a dark brown to yellow.

Marks.— The name of the factory or maker is quite commonly used.

English Delftware.— The beautiful Dutch Delft pieces quickly attracted foreign imitation, and England, aided at first, no doubt, by Dutch potters, soon (the date is somewhat obscure) began making the white opaque-coated ware. This is generally termed *delft-ware* in distinction to true Delft. Lambeth (London) is supposed to have first started this ware, which was then taken up by Bristol and Liverpool. Whereas the Dutch very closely imitated the Chinese styles at first, the English copied the Dutch almost slavishly for a time, but the early product was inferior to the Dutch, its body being coarser and glaze thinner and more uneven. The glaze is not well fused to the body, decoration is inferior and colors cruder. While the Dutch did but one firing for body, glaze and decoration, the English baked the body first, then the decoration and glaze afterward. Much of the ware shows *crazing*. The product was more for use than ornament and consisted of pill-slabs, drug pots, «Merry Men» plates. The latter are both round and octagonal. They are in sets, each with its motto. Thus we find one set with the lines «What is a Mery Man»; the next plate reads «Let him doo all what he kan»; then others «to entertayn his Gests,» «with wyne and Mery jests,» «But if his wyfe doth frowne,» «All meryment goos downe.» Other articles are mugs, dishes, candlesticks, posset pots, three-handle mugs, «puzzle jugs,» etc. Five colors were used — blue, green, yellow, orange, brownish purple. The so-called «blue dash chargers,» with their crude daub, are much prized; they have kings, queens, statesmen, etc., as decoration. Richard Chaffers of Liverpool, shipped so much of his ware to America that this country is now the best source for obtaining specimens.

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CLEMENT W. COUMBE.

DELFTSHAVEN. See DELFSHAVEN.

DELHI, India, city, proclaimed the capital of India in 1911, also capital since 1 Oct. 1912 of a province, formerly a division of the same name, and anciently of the Patan and Mogul empires stands about 700 miles northeast of Bombay, and about 790 miles northwest of Calcutta. It was at one time the largest city in India, covering a space of 20 square miles, and having a population of 2,000,000. It is now reduced to a circumference of seven miles. A vast tract covered with ruins marks the extent of the ancient metropolis of the Mogul empire. The present city, built on two rocky eminences, is surrounded by walls of red sandstone 30 feet high, and from three to five feet thick, with a moat 20 feet broad. There are seven colossal arched gates, defended by round bulwarks, and all built of freestone. The streets of the old part of the city are narrow, but in the modern portion they are broad. The houses here are of sandstone and brick, and are of two and three stories in height. The palace or residence of the Great Mogul, built by Shah Jehan, commenced in 1631, and finished in 10 years, is by far the most interesting building in Delhi, and the most magnificent structure of the kind in India. The Great Mosque, a magnificent structure in the Byzantine-Arabic style, is considered by the Mohammedans the wonder of the world. It is built of white marble and red sandstone, inlaid like mosaic, in lines and arabesques; at the two extreme corners rise minarets 150 feet high, and between them two lofty domes. This imposing edifice was built by the Emperor Shah Jehan, in 17th century, and took several thousand men for six successive years (1631 to 1637) to complete it. There are no fewer than 40 other mosques in different parts of the city, many of them having lofty minarets and gilded domes. The fine structure which stands near the Ajmeer gate was formerly the Delhi College. The famous observatory of Jye Singh, rajah of Jyepoor, at the southwest extremity of the city, has been much dilapidated, and its astronomical instruments nearly all destroyed or carried off. A monument was erected in 1888 by the government to Willoughby, one of the heroes of the siege in 1857. The principal manufactures of the town are cotton cloths, indigo, finely embroidered shawls and jewelry, for which, as well as for delicately carved ivory, Delhi is somewhat noted. The chief imports are by the northern caravans, which bring from Cashmere and Cabul shawls, fruit, and horses. Precious stones of good quality are to be had at Delhi, particularly the large red and black carnelians. The agricultural products of the district consist chiefly of wheat, rice, millet, and indigo. The trade of the neighborhood is centred in Delhi, and the Rajputana State Railroad traverses the district.

Delhi, or as anciently called, Indraprastha, is one of the oldest cities of India. The modern name Dilli or Delhi is first met with in the 1st century B.C. It has been taken frequently by hostile powers. In the beginning of the 19th century the prosperity of the city and country around was threatened with destruction, and the Mogul emperor and royal family were reduced to poverty and distress, by the Mahrattas, who took possession of his capital, of his gardens and houses, and used his name to oppress and impoverish the people by fraud and extortion. From this miserable state of desolation and ruin the city was rescued by the British in 1803, when it was entered and taken possession of by Lord Lake. On the breaking out of the Indian mutiny in May 1857, Delhi became the centre of the operations of the rebels, who flocked to it from all quarters. The nominal representative of the Great Mogul, who held the sovereignty of the place under British protection, joined cause with the rebels; and in addition to assuming the character of an independent potentate, gave his sanction to the massacres and atrocities perpetrated on the European residents. By the middle of June a British army assembled in front of the city, and a siege commenced, which, from the smallness of the besieging force, was necessarily slow and protracted. It was brought to a successful termination on 20 September, when Delhi was entered by the British troops, and the nominal sovereignty heretofore possessed by the king was declared ended; and he himself, after being tried for the murders committed under his authority, was found guilty, and sentenced as a convict to perpetual banishment. A large part of the place was reduced to ruins in the mutiny and siege, but it has since recovered much of its former appearance, and has also been much improved in its sanitary condition by good drainage, an ample water supply, and lighting system. Delhi on 1 Jan. 1877 was the scene selected for the ceremonial proclaiming Queen Victoria 'Empress of India' and also in 1903 and again in 1911 of the brilliant durbars proclaiming Edward VII and George V emperors of India. In 1911 Delhi was proclaimed capital of India and the supreme government was transferred there from Calcutta. Pop. 230,000.

DELHI, N. Y., village and county-seat of Delaware County; on the Delaware River, and a branch of the New York, Ontario and Western Railroad, about 55 miles east of Binghamton. It is in one of the best dairying regions in the country, and the trade is largely in butter, cheese, eggs and agricultural products. Pop. 1,736.

DELIBES, dė-lēb, **Clément Philibert Léon**, French composer: b. Saint Germain du Val, 21 Feb. 1836; d. 18 Jan. 1891. He entered the Paris Conservatoire in 1848, and in 1855 produced an operetta, 'Deux sacs de charbon.' At the Grand Opera, where he became second director in 1865, his music for the ballet 'La Fontaine' (1866), met with great success, and his ballet-music for 'Coppélia' (1870), his finest work, secured his position as a composer. He wrote music for a third ballet and for three comic operas, one of which, 'Le roi l'a dit' (1873), became very popular. In 1880 he was appointed professor in the Conservatoire. Consult Pougin, 'Musiciens du XIXe siècle' (Paris 1911).

DELILAH, dē-lī'lā, the Philistine mistress of Samson. She persuaded him to reveal to her the secret of his great strength, and learning that it lay in his long and thick hair, cut off his locks while he was asleep and then treacherously delivered the helpless man into the hands of his enemies.

DELILLE, dė-lēl, **Jacques**, French didactic poet: b. Aiqueperse, Auvergne, 22 June 1738; d. Paris, 1 May 1813. His translation of Virgil's 'Georgics,' published in 1770, with a 'Discours préliminaire' and numerous annotations, established his fame and obtained him admission to the French Academy. He became professor of Latin poetry in the College of France, and of belles-lettres at the University of Paris. Though an adherent of the old system, Robespierre spared him on every occasion. At his request Delille wrote the ‘Dithyrambe sur l'immortalité de l'âme,’ to be sung on the occasion of the public acknowledgment of the Deity. His reputation mainly rests on the ‘Georgics’ and ‘Les jardins,’ a didactic poem. Other works are ‘L'Homme des champs’; ‘La pitié’; ‘Les trois règnes de la nature’; ‘La conversation’; ‘L'Enéide de Virgile.’ Consult Sainte-Beuve, ‘Portraits littéraires’ (Vol. II, Paris 1864).

DELIQUESCENCE (Lat. «to melt away»), in chemistry the property manifested by many salts, of absorbing moisture from the atmosphere until they become distinctly damp. The name is usually applied to the more pronounced cases, in which the moisture absorbed is so copious that the salt becomes visibly wet, or even dissolves entirely; salts in which the action is less pronounced being called «hygroscopic.» Carbonate of potash, caustic potash and chloride of calcium are familiar examples of delinquescent substances.

DELIRIFACIENT, any drug that induces an irritability of the brain leading to forms of delirium. Thus alcohol for some susceptible minds invariably leads to delirium in the early stages, and also induces delirium in chronic poisoning. Belladonna is a drug that causes a certain amount of delirium, as do also cannabis indica, cocaine and its allies. Opium in small doses brings about an exhilaration and for some delirium. Mescal, a drug widely used among the Indians of South America and of the southwestern United States, also induces a form of delirium. Delirifacients are rarely used in medicine for the effect on delirium.

DELIRIUM is a general disturbance of consciousness, a perversion of the intellectual and perceptive faculties, characterized by a greater or less degree of mental confusion, by more or less transitory delusions and fleeting hallucinations, often accompanied by disordered, senseless speech and muttering, and motor unrest. It varies in degree from the ordinary wandering or flightiness of mild types, such as fever deliriums, to the higher, excited or more violent form, which are then termed maniacal delirium, as seen in delirium tremens, general paresis, katatonia, epileptic or manic-depressive patients. It is a frequent symptom of many brain disorders. Present day psychiatry does not recognize — or designate — any one mental disorder by the term delirium. It is a symptom of many mental disorders. The delirium grave which still persists as a term in psychiatry is an exhaustion or toxic delirium — not a disease per se.

There are innumerable causes of delirium, the more prominent ones being infectious fevers, in the young and able-bodied, diseases dependent upon some specific micro-organism, such as is seen in typhoid fever, pneumonia, scarlet fever, yellow fever, puerperal fever, pyemia and malaria; although delirium occurs also in analogous diseases not proven directly due to any specific micro-organism, also in trauma. Surgical operations are frequently followed by delirium.

In the delirium of intoxication the causes may be divided into endogenous and exogenous, the former arising from within the body proper, such as septic intoxication, pyemic or uremic absorption, cholemia, diabetes, auto-intoxication and insolation, that is, sunstroke. The latter (exogenous) causes are alcohol, drugs, mydriatics, for example, belladonna, duboisin, atropin; also cocaine, morphine, mineral poisons, for example, iodoform.

Delirium due to exhaustion and inanition is seen in acute anæmia, resulting from hæmorrhage of any cause, or the presence in the blood of powerful hæmic poisons, for example, plasmodium of malaria. It is also due to wasting diseases and lactation.

Delirium may originate in central or peripheral lesions of the brain, for example, blood clot from accidental injury, trauma, surgical operations, meningitis or encephalitis. Delirium may also be due to, or associated with, central depression, notably that occasioned by epilepsy, hysteria major, etc.

Delirium of senility is due to inanition and pathologic changes in the cerebral vascular supply.

The delirium of disease, or acute delirium, resembles that arising during febrile diseases; it is ordinarily accompanied by rise of temperature, which pursues no definite course, and by rapid and progressive body weakness (asthenia), and the typhoid state. The treatment consists of utilizing remedial agents that rapidly produce sleep, and fighting the progressive weakness, by stimulating drugs and nutrition, quieting the motor unrest and reducing fever by hydrotherapy, etc.

The treatment of delirium in general is first: Induce sleep, and quiet motor unrest; this is best accomplished by the reduction of fever, the exhibition of proper narcotics, thorough cleansing of the intestinal tract and hydrotherapy. In the selection of hypnotics, the one or the group which is followed by the least depression is advisable. Hyoscamine, in sthenic cases is safe and reliable. Bromide of potassium, chloral hydrate, hyoscin, morphine and opium and the various synthetic coal tar derivatives are frequently used. Second: Discover, if possible, and remove the inciting cause of delirium; to do this the pathological factor must be determined and treated accordingly.

DELIRIUM TREMENS, a form of acute insanity due to alcoholic poisoning marked by sweating, tremor, atonic dyspepsia, restlessness, anxiety, precordial distress, mental confusion and hallucinations. See Delirium.

DE LISLE, Charles. See Leconte de Lisle, C.M.R.

DELISLE, dė-lēl, **Guillaume**, French geographer: b. Paris, 28 Feb. 1675; d. there, 25 Jan. 1726. He was instructed by Cassini, and soon conceived the idea of reforming the whole system of geography. He published, in his 25th year, a map of the world, maps of Europe, Asia and Africa, and a celestial and a terrestrial globe of a foot in diameter. By rejecting Ptolemy's statements of longitude, or rather by comparing them with the astronomical observations and the statements of modern travelers, he founded the modern system of geography.

DELISLE, Joseph Nicolas. French astronomer: b. Paris, 4 April 1688; d. there, 11 Sept. 1768. He was a brother of Guillaume Delisle (q.v.). Among his works are 'Mémoires pour servir à l'histoire et au progrès de l'astronomie' (1738); 'Mémoire sur les nouvelles découvertes au nord de la Mer du Sud' (1752).

DELITZSCH, dā'lĭch, **Franz,** German Hebraist and theologian: b. Leipzig, 23 Feb. 1813; d. there, 4 March 1890. He was educated in the university of his native city, became professor of theology at Rostock in 1846, at Erlangen in 1850, and in 1867 at Leipzig. His earlier works dealt with post-biblical Jewish literature, and he afterward wrote commentaries on various books of the Old Testament. He was also the author of numerous theological and devotional works, among which were 'Biblico-prophetic Theology' (1845); 'The House of God' (1848); 'Biblical Psychology' (1855); 'Jesus and Hillel' (1867); 'Christian Apologetics' (1869); 'Ein Tag in Kapernaum' (1871); 'Durch Krankheit zur Genesung' (1873). He was chiefly eminent as a commentator on the Old Testament, and his honesty as a theologian was shown in the concessions he was willing to make (in the last edition of his commentaries on Genesis and Isaiah, 1887) to the latest critical views of the Pentateuch. He interested himself in the conversion of the Jews — he was of Hebrew descent — and for this purpose used his great knowledge of Hebrew and the Talmud and founded a training school in 1886, now called the Institutum Delitzschianum. His translation of the New Testament into Hebrew (1877) was widely circulated in Galatia and Russia. Consult Curtiss, 'F. Delitzsch' (London 1891).

DELITZSCH, Friedrich, German Assyriologist: b. Erlangen, Bavaria, 5 Sept. 1850. He is a son of Franz Delitzsch (q.v.). He has published among other works 'Assyrian Studies' (1874); 'Where is Paradise?' (1881); 'Prolegomena of a New Hebrew and Aramaic Vocabulary to the Old Testament' (1886); 'Assyrian Vocabulary' (1887 onward); 'Assyrian Grammar' (1889); 'Assyrisches Handwörterbuch' (1894-96); 'Das Babylonische Weltschöpfungsepos' (1896); 'Babel und Bibel' (1902; Eng. trans., 1903); 'Asurbanipal und die assyrische Kultur seiner Zeit' (1909); 'Handel und Wandel in Altbabylonien' (1910); 'Kleine sumerische Sprachlehre' (1914); 'Sumerisches Glossar' (1914), and numerous articles in *Mitteilungen der Deutschen Orient-Gesellschaft* (1899-1913), and a translation of George Smith's 'Chaldean Account of Genesis.' In 1877 he became extraordinary professor in Leipzig, ordinary professor at Breslau in 1893, and in 1899 professor of Assyriology in the University of Berlin. His lectures attained a wide popularity, and one of them, entitled 'Der babylonische Ursprung hebräischer Ideen', delivered in 1901, was attended by Emperor William II who also gave a large sum toward the researches to be made in the territory of ancient Babylonia. In 1906 he lectured in the United States.

DELITZSCH, Germany, town of Prussian Saxony, on the Löber, 15 miles north of Leipzig. The town is well built and portions of its ancient walls are still to be seen. It contains a castle, first erected in the 14th century and renovated late in the 17th, which is now converted into a penitentiary for female delinquents. The town's industries include brewing, cigar-making, preparation of cereals, sugar refining, shoemaking and also woolens and hosiery. Christian Gottfried Ehrenberg, the naturalist, and Schulze-Delitzsch claim Delitzsch as their birthplace. Several important fairs are held each year. Pop. 13,031. Consult Lehman, 'Chronik der Stadt Delitzsch' (Delitzsch 1852).

DELIUS, dā'lē-oos, **Nikolaus,** German Shakespearian critic: b. Bremen, 19 Sept. 1813; d. Bonn, 18 Nov. 1888. He studied philology at Bonn and Berlin, and in England and France. He settled in 1846 in Bonn, where he taught from 1855-80. He published a critical edition of Shakespeare (1854-61); 'Shakespeare-Lexikon' (1851); 'Über das englische Theaterwesen zu Shakespeares Zeit' (1853).

DELIVERY, *in law,* the transfer of a deed from the grantor to the grantee or to some person acting in his behalf, in such a manner as to deprive the grantor of his right to recall it at option. A delivery may be either *absolute,* i.e., to the grantee himself; or *conditional,* i.e., to a third person to hold till some specified conditions be performed on the part of the grantee. In certain cases such as in wills, bonds made by a parent in favor of his children, or deeds in which the grantee himself has an interest, or where there is a mutual obligation between the parties, delivery is not required.

In contracts, delivery refers to the transfer of the possession of a thing from one party to another. Often the actual transfer of goods does not take place. Delivery sometimes denotes transfer of property in chattel and sometimes transfer of the right of possession of the chattel. In the latter sense it may refer either to the formation of the contract or to the performance of it.

DELLA CRUSCANS, krŭs'kanz, a coterie of English poetasters resident about 1785 in Florence (and so named from the Accademia della Crusca of that city), who took to penning verses, which they published under the name of the 'Florence Miscellany.' Notwithstanding the inconceivable silliness and affectation of these productions they found numerous admirers. The newspapers of the day began to give publicity to their lucubrations. Genuine poetry seemed for a time at a discount, and nonsense and Della Crusca prevailed. The frenzy was, however, of short duration. The 'Baviad' (1794) and 'Mæviad' (1796) of William Gifford swept the butterfly Orlandos, Carlos, Lauras, Marias "and a thousand other nameless names" into merited oblivion.

DELLA MARIA, Dominique, French musician: b. Marseilles 1768; d. Paris, 9 March 1800. He was very precocious, but his fame rests upon the score he wrote for 'The Prisoner' by Duval.

DELLA ROBBIA, Luca. See ROBBIA, LUCA DELLA.

DELLA ROBBIA WARE, brown terra-cotta bas-reliefs thickly enameled with tin-glaze; made at Florence (chiefly in 1450-1530; in France 1530-67); so called from the name of the artist and its attributed inventor, Luca Della Robbia. The most important and largest work in this ware, perhaps, is the frieze on the hospital at Pistoia, made after the artist's death. At Tamworth, England, there is a plant, founded in 1847, that turns out this style of pottery, especially for architectural decorations, with great success.

DELLENBAUGH, Frederick Samuel, American artist and author: b. McConnelsville, Ohio, 13 Sept. 1853. He was educated in Buffalo, New York city, Munich and Paris. He was assistant topographer and artist of Major Powell's second expedition down the Colorado River in 1871–73, and accompanied the Harriman expedition to Alaska and Siberia in 1899, and made several personal expeditions to the Southwest. From 1909 to 1911 he was librarian of the American Geographical Society, and is a member of the American Ethnological Society. He has written 'The North Americans of Yesterday' (1900); 'The Romance of the Colorado River' (1903); 'Breaking the Wilderness' (1905); 'A Canyon Voyage' (1908); 'Frémont and '49' (1913). He contributed to Sturgis' 'Dictionary of Architecture' on American aboriginal buildings.

DELLYS, dĕl-lēz', Algeria, a seaport in the department of Algiers, 49 miles east of the city of Algiers. The inhabitants are mostly French and Arabs. It contains the mosque of the Mohammedans and the mission school of the Christians. The trade is principally in grain, oil and salt. The city is now under French control. Pop. 3,987.

DEL MAR, Alexander, American political economist: b. New York, 9 Aug. 1836. He was educated at New York University and in Europe. He edited the *Daily American Times* in 1854; *Hunt's Merchants' Magazine* 1860; the *Social Science Review* in 1864; and the *Financial Chronicle* in 1865. In the latter year he organized and was director of the United States Bureau of Statistics, Navigation, Emigration and Commerce (now the Department of Commerce and Labor). He was appointed United States delegate to the International Congress at Turin 1866; The Hague 1868; Saint Petersburg 1872. In 1876, he became mining commissioner of the United States Monetary Commission. He is president of the Latin-American Chamber of Commerce; member of the Société de Statistique de Paris, of the Société Astronomique de France, of the Ligue de l'Enseignement de Bruxelles, and numerous politico-economical societies. He has written 'Gold Money and Paper Money' (1862); 'Resources, Productions and Social Conditions of Egypt, Spain, France, Germany, Russia, etc.'; 'History of the Precious Metals' (1879); 'History of Money in Ancient States' (1881); 'History of Monetary Systems' (3d ed., 1901); 'Fluctuations of Gold'; 'The Law of Payment'; 'Essay on Corporations'; 'Money and Civilization' (1885); 'The Science of Money' (1889); 'History of Monetary Crimes' (1899); 'History of Money in Modern States'; 'History of Money in America' (1900); 'History of Money in Greece, Rome, Great Britain, France, Germany, Russia, Spain, etc.'; 'The Middle Ages Revisited'; 'Barbara Villiers and the Mint Act'; 'The Aryans and the Conquest of India' (1911); 'History of the Precious Metals'; also numerous other works, including over 100 brochures on national and sociological subjects.

DELMONTE Y TEJADA, dāl-mōn'tā ē tā-hä'dä, **Antonio,** Dominican historian: b. Santiago de los Caballeros, Santo Domingo, 29 Sept. 1783; d. Havana, 19 Nov. 1861. He studied law at the University of Santo Domingo. His share in the campaign against Toussaint l'Ouverture, caused him to seek refuge at Havana, where he became an official of the government. He is the author of 'Historia de Santo Domingo' (1853), a history of the island from its discovery.

DE LOACH, Robert John Henderson, American botanist: b. Statesboro, Ga., 21 Dec. 1873. He was graduated at the University of Georgia in 1898. In 1900 he was superintendent of city schools at Swainsboro, Ga., 1900; taught in the United States Indian School at Fort Sill, Okla., 1900–02. In 1903–05 he was principal of the Statesboro High School and in 1906–08 botanist of the Georgia Experiment Station; professor of cotton industry at the Georgia State College of Agriculture since 1908, and director of the Experiment Station since 1913. During the summer of 1911 he was collaborator in the Bureau of Plant Industry at Washington. He has written 'Rambles with John Burroughs' (1912); 'Agriculture for the Common Schools,' and bulletins on plant breeding and diseases, and contributions to periodicals. He is editor of the agricultural department of the *Atlanta Constitution.*

DELOLME, dė-lōlm', **Jean Louis,** Swiss writer: b. Geneva in 1740; d. Switzerland, 16 July 1806. He at first practised as a lawyer in his native city, but the part which he took in its internal commotions obliged him to go to England, where he passed some years in great poverty. He became known by his once celebrated but superficial 'Constitution de l'Angleterre,' translated by the author himself into English in 1772. Delolme also published in English his 'History of the Flagellants or Memorials of Human Superstition' (1783); an 'Essay on the Union with Scotland' (1796). He returned to Switzerland about 1775.

DE LOME, dė-lōm', **Enrique Dupuy,** Spanish diplomatist: b. Valencia, Spain, August 1851; d. Paris, France, July 1904. He became first secretary of the Spanish legation in Washington in 1882, and minister to the United States in 1892 and 1895. In February 1898 it was discovered that he had written a letter to Señor Canalejas, a Spaniard of high rank who had been in United States a short time previous supposably to make observations for the Spanish government. The letter, which followed Canalejas to Havana, and was probably abstracted from his apartments there by some friend of the insurgents, contained disparaging phrases regarding the President of the United States, and otherwise plainly showed that neither the writer nor the recipient of it believed that Spain was acting in good faith with the United States government. De Lome at first denied the genuineness of the letter, but it was proved beyond a doubt that he was the author, and he telegraphed his resignation to Madrid on 9 February.

DE LONG, George Washington, American naval officer and Arctic explorer: b. New

York, 22 Aug. 1844; d. Siberia, 30 Oct. 1881. He was graduated from the Naval Academy in 1865; he reached the grade of lieutenant-commander, and perished of cold and exposure while in command of the Jeannette Expedition in 1879–81. His body was finally recovered by George W. Melville and Lieutenant Danenhower, and was taken to New York for burial. His journals have been published, entitled ‹The Voyage of the Jeannette› (1883); and the story of the search for the survivors is told in Melville's ‹In the Lena Delta› (1884).

DELOO, an African antelope, one of the duiker-bok (q.v.).

DELORME, dĕ-lôrm, **Marion**, French courtesan: b. Blois, 3 Oct. 1613; d. Paris, 2 July 1650. Her beauty and wit soon made her house the rendezvous of all that was gallant and brilliant in Paris. The king, the princes of Condé and Conti, Buckingham, Cinq-Mars, Saint Evremont, were among her admirers. The leading spirits of the Fronde regularly assembled in her house, and she is said to have assisted them in their enterprises. Mazarin was about to have her arrested when she died suddenly. The legend arose in France that the death and funeral were a mere pretense, got up to permit her to make her escape. She is said to have crossed over to England and married a rich lord, who shortly afterward died. She then returned to France, married a chief of brigands, who was captivated by the charms of his victim. After his death she married a procurator of finance in Franche-Comté, with whom she spent 22 years of her life. Upon his death prosperity forsook her. Plundered by adventurers and her own servants, she died in extreme poverty in 1706, or according to another story in 1741, at the age of 129 years. Victor Hugo has taken her as the subject of one of his dramas; Alfred De Vigny makes her the leading character in his novel ‹Cinq-Mars.› The story of her life and the legends concerning her were written by Peladan (Paris 1882).

DE L'ORME, Philibert, French architect: b. Lyons 1515; d. Paris, 8 Jan. 1570. He studied in Rome, aided by Cardinal de Ste. Croix, and became the favorite architect of Henry II and Diane de Poitiers. On the death of Henry II he was in disfavor for some time. He began the Tuileries for Catharine de Medici. The Château d'Anet, at the commission of Diane of Poitiers was begun in 1552, and was one of his chief works; another is the tomb of Francis I, at Saint Denis. Numerous châteaux of France are attributed to him. He wrote a book which was long a high authority on architecture: ‹Nouvelles inventions pour bien bastir et à petits frais› (Paris 1561). Critics ascribe a high place to De l'Orme, as one of the chief figures in the French renaissance of architecture. He was strongly nationalistic in his tendencies and strove to create a distinctive French style. He succeeded in making new adaptations of the Greek forms and paved the way for further innovations. Consult Vachon, ‹Philibert de l'Orme› (Paris 1887).

DELORME, Pierre Claude François, French genre painter: b. Paris, 28 July 1783; d. there, 8 Nov. 1859. He was a pupil and imitator of Girodet. Among his works are ‹Death of Abel› (1810); ‹Hero and Leander› (1814); ‹Raising of Jairus' Daughter› (1817), in church of Saint Roch, Paris; ‹Christ Reappearing› (1819), in Notre Dame, Paris; ‹Cephalus Carried Off by Aurora› (1882), in the Luxembourg; ‹Hector Reproaching Paris› (1824); ‹Sappho Reciting an Ode to Phaon› (1833); ‹Eve Plucking the Forbidden Fruit› (1834); ‹Magdalen at the Sepulchre› (1835); ‹Adam and Eve After the Fall› (1839); ‹Holy Family in Egypt› (1850).

DELORT, dē-lôr', **Charles Edouard,** French painter: b. Nimes, 4 Feb. 1841; d. 10 March 1895. He was a pupil of Gleyre and of Gérôme. Among his works are: ‹Daphnis and Chloe›; ‹The Stolen Cattle› (1866), Museum of Nimes; ‹Confidence›; ‹Starting for the Chase› (1873); ‹Marauders› (1874); ‹Embarking of Manon Lescaut› (1875); ‹After Breakfast› (1876); ‹A Poacher›; ‹Admonition› (1880); ‹Capture of the Dutch Fleet by the Hussars of the French Republic› (1882); ‹Return from the Review› (1884); and ‹Return from Exile› (1889).

DELOS, dē'lŏs (ancient ASTERIA; CYNTHUS; ORTYGIA), the central and smallest island of the Cyclades, in the Ægean Sea, a rugged mass of granite about two square miles in extent. Near the centre of the island is a rocky hill, Mount Cynthas, 360 feet high.

Delos, according to old legends, was raised from the sea-bottom by Poseidon. It was then a naked rock floating about in the ocean, and was accidentally driven by the waves into the centre of the Cyclades. The earth had promised Hera (Juno), with an oath, not to grant a resting place to the fugitive Latona where she might be delivered. The unhappy goddess wandered restlessly over the earth until she perceived the floating island. As this was not stationary, it was not comprehended in the oath of the earth, and offered her an asylum. Here Latona bore the infant gods Apollo (who was hence called *Delios*) and Artemis (who was called *Delia*). Both were worshipped on this island. Delos was thenceforth no longer the sport of the winds; it was moored to the bottom of the Ægean with adamantine chains by Zeus, and the fame of the isle spread over the world. Thus far mythological tradition.

At an early period the island, occupied by the Ionians, had kings of its own, who also held the sacerdotal office. In the course of time it came under the dominion of Athens. In 477 B.C. Delos became the common treasury of the league against Persia, but the money was afterward transferred to Athens. In 426 the Athenians purified Delos by removing all the tombs, and thenceforth they prohibited births and deaths from taking place on the island. In 422 they removed all the Delians from the island in order to complete its purification, but soon afterward these were allowed to return. After the destruction of Corinth the rich Corinthians fled thither and made Delos the seat of a flourishing commerce. Delos had a famous temple of Apollo, built of Parian marble, and containing, besides the beautiful statue of the god, a remarkable altar, from which the Delian problem (Doubling the Cube), as it is called, had its name. The inhabitants, having consulted the oracle concerning the remedy for a plague which raged in Delos, were ordered to double the altar of Apollo, which was a cube. A solution of this problem of the duplication of the cube was attempted in different ways by several of the ancient mathematicians. The Grecians celebrated the Delian festival here every five years; and the Athenians performed annually the pilgrimage called *theoria,* with processions and dances.

Delos was celebrated in ancient times for the number and the excellence of its artists, and workers in silver and bronze. Cicero, in his oration for Roscius, has many eulogiums upon the fine vases of Delos and Corinth. Delos, called Dili or Sdili, is now without permanent inhabitants; a few shepherds from the neighboring islands of Mycenos and Rhenea pay it summer visits with their flocks. Some ruins of its former magnificence yet exist. Among these are remains of the temple of Apollo above referred to, of one to Latona, of an amphitheatre, etc., besides a curious primitive temple of Apollo, called the Cave of the Dragon, which is not a real cave.

In 1829 the work of exploration of the ruins began under Blouet; in 1873 Lebègue explored the ancient shrine and grotto on Mount Cynthus. Since 1877 the work of excavation, still under French auspices, has proceeded largely under the direction of Théophile Homolle. The procedure has been slow and economical, and the results excellent. Delos is the only ancient Greek city that remains approximately intact. It may almost be termed the Greek Pompeii in view of the scientific results which it has yielded. The complete plan of the sacred precinct of Apollo has been recovered; together with the theatre, the temple on Mount Cynthus, the temples of foreign gods, and an extensive part of the commercial section of Hellenistic and Roman days. Sculpture of all periods has been found in abundance, as well as inscriptions throwing light on various points of discussion. Not the least interesting of the finds has been a series of accounts, presenting what may be called a balance sheet, which throws light on mundane or financial side of the religious life of the time.

From the ancient mole there is an approach to the precinct of Apollo through an avenue flanked by porticos. The temple of Apollo is the centre of the precinct. It is a Doric work, with 13 columns at either side, and six in front and rear; and having comparatively few sculptural decorations. It dates from the early 4th century B.C. The decorative groups on the two gables have been in part recovered, and are now in the National Museum, Athens. To the north of the precinct of Apollo are large remains of the commercial Delos. In the 2d and 1st centuries B.C., Delos was the chief commercial town of the eastern Mediterranean. The most extensive building in this region is a kind of exchange, with a very large court encircled by apartments. The shore, facing Rhenea, was lined with docks and warehouses. A well of six metres in depth was found filled with tablets of marble and bronze, having upon them 20 ancient inscriptions regarded as of great value. The sanctuaries contain exvotos, stelæ, and inscriptions on marble and bronze giving in full detail accounts of the high priests and catalogues of the offerings brought by pilgrims. Streets, gardens, and sewage canalization may be distinctly traced. Interesting private houses have also been discovered. Mention should also be made of the long and narrow hall, extending north and south and entered through a portico at its southern end, having at its northern end the famous "altar of horns," composed of the horns of the victims and accounted one of the seven wonders of the world. The entire building is often called "The Sanctuary of the Bulls," from the design of the capitals of the two columns separating the altar from the remainder of the hall. Consult Diehl, 'Excursions in Greece' (Eng. trans. by Perkins, 1893); A. E. Haigh, 'The Attic Theatre' (3d ed., Oxford 1907); Homolle, 'De Antiquissimis Dianæ Simulacriis' (Paris 1885); 'Les archives de l'intendance sacrée de Delos' (Paris 1886) and 'Exploration archéologique de Délos (parts 1–3, Paris 1910–11); Sir R. C. Jebb, 'Journal of Hellenic Studies' (Vol. I, London 1881); Lebègue, 'Recherches sur Délos' (Paris 1876) and Baedeker's 'Greece.'

DELPHI, the seat of the most famous oracle of ancient Greece, was situated in Phocis, on the southern side of Parnassus. Apollo, according to fable, having killed the serpent Python, and determining to build his sanctuary here, perceived a merchant vessel from Crete sailing by. He immediately leaped into the sea in the form of an immense dolphin (Greek, *delphis*), took possession of the vessel, and forced it to pass by Pylos, and to enter the harbor of Crissa, not far from Delphi. After the Cretans had landed he assumed the figure of a beautiful youth, and told them that they must not return to their country, but should serve as priests in his temple. Inspired, and singing hymns, the Cretans followed the god to his sanctuary on the rocky declivity of Parnassus; but, discouraged by the sterility of the country, they implored Apollo to save them from famine and poverty. The god, smiling, declared to them the advantage which they would derive from serving as his priests. They then built Delphi, calling the city at first Pytho, from the serpent which Apollo had killed at this place. The oracles were delivered from a cave called Pythium. Tradition ascribes its discovery to a shepherd who pastured his flocks at the foot of Parnassus, and was filled with prophetic inspiration by the intoxicating vapor which arose from it. Over the cave, which was contained in a temple, was placed the holy tripod, upon which the priestess called Pythia, by whose mouth Apollo was to speak, received the vapors ascending from beneath, and with them the inspiration of the Delphian god, and proclaimed the oracles (hence the proverb, to speak *ex tripode,* used of obscure sentences, dogmatically pronounced). After having first bathed herself, and particularly her hair, in the neighboring fountain of Castalia, and crowned her head with laurel, she seated herself on the tripod, which was also crowned with a wreath of the same, then, shaking the laurel tree and eating perhaps some leaves of it, she was seized with a fit of enthusiasm. Her face changed color, a shudder ran through her limbs, and cries and long protracted groans issued from her mouth. This excitement soon increased to fury. Her eyes sparkled, her mouth foamed, her hair stood on end, and almost suffocated by the ascending vapor, the priests were obliged to retain the struggling priestess on her seat by force; then she began, with dreadful howlings, to pour forth detached words, which the priests collected with care, arranged them, and delivered them in writing to the inquirer. At first the answers were given in verse, or were put into hexameters by priests of the temple who were poets, but in later times, the authority of the oracle being diminished, they contented themselves with delivering them in prose. This oracle was always obscure and equivocal; yet it served, in earlier times, in the hands of the priests, to regulate and uphold the political, civil and religious relations of Greece. It enjoyed the reputation of infallibility for a long time; for the Dorians, the first inhabitants of the place, who soon settled in all parts of Greece, spread an unbounded reverence for it. At first only one month in the year was assigned for the delivery of oracles; afterward, one day in each month; but none who asked the god for counsel dared approach him without gifts. Hence the splendid temple possessed immense treasures, and the city was adorned with numerous statues and other works of art, the offerings of gratitude. Delphi was at the same time the bank in which the rich deposited their treasures, under the protection of Apollo, though this did not prevent it from being repeatedly plundered by the Greeks and barbarians. Although the sanctuary and its treasures had been almost miraculously preserved from the Persians and Gauls, they were forced by Sulla to contribute to the payment of his soldiers, and Nero removed 500 brazen images from the sacred precincts. Constantine the Great enriched his new city by the sacred tripods, the statues of the Heliconian Muses, the Apollo, and the celebrated Pan dedicated by the Greek cities after the conclusion of the war with the Medes.

The ancients believed Delphi to be the centre of the earth; this, they said, was determined by Jupiter, who let loose, from the east and from the west, two eagles, which met here. The tomb of Neoptolemus (or Pyrrhus), son of Achilles, was at Delphi, and near it the famous Lesche, adorned by Polygnotus with the history of the Trojan War. In the plain between Delphi and Cirrha the Pythian games were celebrated. These national games, and the protection of the Amphictyons, gave Delphi a lasting splendor. It is now a village called Castri, near which the Castalian spring may still be seen.

In 1892 the site of Delphi, until that time occupied by the village of Castri, was purchased by the French government, a new village was established farther westward, and the French School at Athens, under the direction of Théophile Homolle, began important excavations. The entire precinct has been revealed, and, with the assistance of Pausanias' 'Itinerary,' many structures have been identified, including the altar, temple, stadium, theatre, treasuries and other buildings. More than 3,000 inscriptions have been found, many of great value for Grecian history. The sculpture discovered contributes much to the history of art in the late 6th and early 5th century B.C. The ancient wall (the Hellenico), extending east and west, has been recovered in its entire length, and the two boundary walls, climbing the hill at either end of the Hellenico, have been traced. The main entrance was in the eastern of these two walls, and from this the Sacred Way proceeds by a zigzag course to the temple. Just within the precinct wall, on the northern side of the Sacred Way, stood the large building dedicated as an offering by the Lacedæmonians after the battle at Ægospotamos (q.v.). To the west, on the southern side of the way, was the Sicyonian treasury, in the form of a Doric temple, distyle *in antis*. Still further westward, on the same side of the way, is the Cnidian treasury, originally a small marble Ionic temple, distyle, with a sub-structure of tufa. The sculpture from the pediment and frieze of this building, and the fragments of moldings, are of very considerable interest. The structure has been described as perhaps the most nearly perfect extant example of the transitional style of the early 5th century B.C. Here the Sacred Way makes a decided turn; and further north, but still on the same side of the way, is the Athenian treasury — a Doric temple *in antis*, of small size, with a basis bearing the remains of a dedicatory inscription which announces that it was built with the spoils from the battle of Marathon (q.v.). It was on stones in this treasury that the hymns to Apollo with ancient musical notation were found. Beyond this treasury was the many-fluted "Column of the Naxians," which supported the colossal marble sphinx, now in the museum.

The site of the temple shows the remains of various successive buildings. Many remains have been recovered of that built by the Alcmæonidis (6th century), which was destroyed by an earthquake. Some archaic sculptures discovered have been assigned to the gables of this structure. The foundations now extant are those of the temple built in the 4th century. No definite information can be gained as to the oracle. The theatre, in the northwest corner of the precinct, dates from the early 2d century and is one of the best preserved in all Greece. The walls and seats of the auditorium remain; there are 33 tiers of seats arranged in seven sets, with a paved longitudinally intersecting passage, or diazoma. Consult the 'Bulletin de correspondance hellénique' (Vols. XVII et seq.; Vols. XVI, XVII, Paris 1893 et seq.) and the 'Comptes rendus de l'académie des inscriptions' (Paris 1893 et seq.); Mommsen, 'Delphika' (Leipzig 1878).

DELPHI, Ind., city of Carroll County, of which it is the county-seat, about 20 miles southwest of Logansport, and 60 miles north by west of Indianapolis; on the Wabash River and the Louisville, New Albany and Chicago, the Wabash and other railways. The waterpower is excellent. There are lime-works, the lime interests being extensive; besides paper mills, wagon and carriage manufactories, flour and planing-mills and a bent-wood factory. There are municipal waterworks and a public library. Pop. 2,161.

DELPHIN CLASSICS (*Auctores Classici in usum Serenissimi Delphini*), a collection of the works of the Latin classic authors, prepared by order of Louis XIV, at the suggestion of the Duke of Montausier for the use of the dauphin of France. The Duke of Montausier was the dauphin's governor, and in making a selection of authors, texts and editors, employed the services of Bossuet, "the Eagle of Meaux," and Huet, bishop of Avranches, both preceptors to the young prince. This collection of the Latin classics does not comprise all the works of Latin writers that are extant, and it contains a few authors to whom the title classic can be given only by a very generous interpretation of the word. A notable omission of a genuine classic is the 'Pharsalia' of Lucan, which seems to have been dropped, as having no place in the library of the heir of an absolute monarch. The series was completed in 64 volumes, 4to, including a 'Dictionary of Antiquities' in one volume. The text is accompanied by copious explanatory notes (in Latin), and, in the case of all poets and of difficult prose writers (Tacitus, for instance), by an interpretation in easier Latin. The same is done in the case of all difficult phrases occurring anywhere in the prose authors. The complete works of the several classics, as far as extant, are given; as well as the spurious works commonly attributed to them. A valuable feature of this collection is the very complete verbal index to the works of each author. In the years 1819–30 Valpy, of London, republished the Delphin Classics, with the whole of the notes and interpretations, but usually with the texts as amended by later critical research. To the notes of the Delphin edition Valpy added very voluminous *Notæ Variorum.* These last far exceed in bulk both the text and notes of the original Delphin Classics. Consult Sandys, 'A History of Classical Scholarship' (Vol. II, Cambridge 1908).

DELPHINE, a romance by Madame de Staël, published in 1802. Its bold imagery, keenness of observation and power of impassioned description, perhaps justify 'Delphine's' position among the masterpieces of French literature. But neither situations nor characters are true to nature. The romance had a special interest for Madame de Staël's contemporaries, for several of the great men and women of the time appear in it under the thinnest of disguises. As in the case of "Corinne," the liberal ideas scattered through the story drew down on the author the anger of Napoleon, who ordered her to leave France.

DELPHINIA, a festival celebrated in honor of Apollo (Delphinios being one of his names) at Athens, on the 7th of the month Munychion (April). On this occasion a procession of girls bearing garlands marched to the temple of the god to seek his favor more especially, perhaps, in the interests of seamen.

DELPHINIDÆ, the dolphin family of cetaceans. See DOLPHIN; NARWHAL; PORPOISE.

DELPHINIUM, a genus of beautiful annual and perennial plants of the crowfoot family (*Ranunculaceæ*), with large irregular flowers, comprising about 60 species, natives for the most part of the north temperate zone; some few species are found in the mountains of Mexico. The name is a reference to the supposed resemblance of the flower to a dolphin. The genus is represented in America by about 25 species, which are known as larkspur, with blue or purple flowers, rarely red or white. The field larkspur (*D. ajacis*) is found in waste places in southern New Jersey, Pennsylvania and farther southward, naturalized from Europe. The cultivated plants have shorter spurs and longer and denser racemes of flowers. The tall larkspur (*D. exaltatum*) is found in the woods of central Pennsylvania, west to Minnesota, south to Nebraska, northern Alabama and North Carolina. Other species extend the range of the genus westward across the continent. From the European *D. staphisagria,* stavesacre, is extracted an alkaloid known as delphinine. The field larkspur is a simple astringent.

DELPHINUS, dĕl-fī'nŭs (the dolphin), one of Ptolemy's original 48 constellations, situated between Vulpecula, Pegasus, Equuleus, Aquarius and Aquila. It has no stars brighter than the third magnitude. The names Sualocin and Rotanev assigned to its stars Alpha and Beta, are merely reversals of the name Nicolaus Venator, an astronomer's assistant, who wished to commemorate himself.

DELPHOS, Ohio, city in Allen and Van Wert counties, situated on the Miami and Erie Canal, and on the Pennsylvania and other railroads; about 70 miles southwest of Toledo. The principal industry of the city is the Fort Wayne railroad repair shops. It has marble and granite works, paper and flour mills, brewery and manufactories of galvanized iron products, oil cans, printing presses, furniture, pipe, etc. Settled in 1834, Delphos was incorporated in 1851 as a village and become a city in 1913. Its government is administered by a mayor, elected biennially, and a municipal council. It owns the water plant and has a Carnegie library.

DEL RIO, Tex., county-seat of Val Verde County; about five miles from the Rio Grande River; 170 miles west of San Antonio, on the Southern Pacific Railroad. Notable features of the city are the San Felipe Springs, a hospital, two convents and the Federal building. Its industries are those of an agricultural and stock-raising region, and it has several small cotton and wool manufacturing plants. Pecans, wool, hides, livestock, fruit and vegetables constitute important exports. Del Rio has adopted the commission form of government. Pop. 9,000.

DELSARTE, dĕl-särt, **François Alexandre Nicolas Chérie,** French educator: b. Solesmes, 19 Dec. 1811; d. Paris, 19 July 1871. He attained distinction as a tenor singer in the Opéra Comique, suddently lost his voice, and thereafter applied himself to muscial and dramatic instruction, having among his pupils many who afterward achieved operatic and dramatic celebrity. He was author of several melodies and romances, but his chief work was the elaboration of a system of dramatic expression, by which the voice and entire action of the body were trained by fixed rules. He aimed to make elocution a science. His system, at least in part, has of late been gaining many adherents among elocutionists.

DELSARTE METHOD, a system of physical training for voice and gesture, invented by François Delsarte (q.v.). It is not a method of gymnastics, but a system of exercises to gain poise and breath control.

DELTA, the name of the fourth letter of the Greek alphabet, the capital form of which is an equilateral triangle. The name is also applied to a tract of land triangular in shape, generally formed by the deposit of river sediment, especially at the mouths of rivers which flow into lakes or seas. A mountain stream changing the force and rapidity of its current upon entering a level plateau deposits at the base of the mountain sediment which assumes the triangular form and is called a cone-delta or a fan-delta, or an alluvial fan.

The nature of the current in the body of water receiving the river deposit has much to do with the size of the delta. A swiftly-flowing current or high tides carry off the deposit from the shore line, sometimes forming long coast islands or sand-bars or sand-spits, or distributing the sediment over the ocean bed; but slowly moving waters are conducive to large deltas. The almost tideless Mediterranean and Gulf of Mexico have deltas at the mouths of the large rivers which bring deposits to the sea. Usually the finest particles of land waste are swept away by currents, but the rest accumulates at the mouth of the river and builds up a fan-shaped land mass, or delta, in front of the old shore line. Old rivers that bring down much sediment, may, if the coast is neither uplifted nor depressed, build deltas of great size. In the case of a river emptying into a sea even the fine waste brought down falls to the bottom before long, as the salts in the sea water precipitate matter in suspension. The river usually enters the sea over the front of its delta by several channels, these branches of the main stream being called distributaries. An excellent example is the way the Mississippi divides up at its mouth. As a large river bringing down waste can build a delta even where waves and tidal currents are active in distributing the material, the absence of a delta at the mouth of a large river indicates generally some recent change of level. Thus the absence of deltas along the Atlantic coast of the United States is due to a slow depression of the coast, still in progress. This submergence of the coast has a tendency to create estuaries at the mouths of rivers. Some notable deltas are those of the Po, Hoangho, Ganges and Niger. As showing how rapidly a delta may grow, Adria in Italy was a seaport in the time of Augustus, but the growth of the Po delta has left it 20 miles inland. The Mississippi delta is advancing into the Gulf of Mexico at the rate of one mile in 16 years. The Mississippi delta is, in area, about 12,500 square miles; that of the Nile about 10,000 square miles. Large rivers frequently change the channel of their distributaries, thus making the deltas unsafe for dwelling places. Consult Geikie, ‘Elementary Lessons in Physical Geography’ and ‘Text Book of Geology’ (London 1903); Tarr, R. S., ‘Physical Geography’ (ib., 1906).

DELTA METAL, an alloy containing 56 parts of copper, 42 of zinc and small quantities of iron, lead and manganese. It is said to be as strong as mild steel, over which it has the advantage of not rusting by exposure to the weather. Delta metal is largely used in England and Germany, especially in shipbuilding, and is also employed in the United States, though to a more limited extent.

DELUC, dė-lük′, **Jean André,** Swiss geologist and meteorologist: b. Geneva, 8 Feb. 1727; d. Windsor, England, 8 Nov. 1817. He passed the first half of his life in commercial pursuits. In 1773, obliged by commercial disaster to quit his native city, he went to England, was elected a Fellow of the Royal Society of London, and appointed reader to the queen, a situation he held for 44 years. He made numerous geological excursions in central Europe and in England, of which he has published accounts. He enriched science with very important discoveries. Among his numerous writings are his ‘Recherches sur les modifications de l'atmosphère’ (1772); ‘Nouvelles idées sur la météorologie’ (1786); ‘Traité élémentaire de géologie’ (1810); and ‘Letters physiques et morales sur les montagnes et sur l'histoire de la terre et de l'homme’ (1778), the most important of his works, in which he endeavors to reconcile the account of the origin of the earth in Genesis with geological data.

DELUGE (through the French, from Lat. *diluvium,* «a flood»). There is scarcely any considerable race of men among whom there does not exist, in some form, the tradition of a great deluge, which destroyed all the human race except their own progenitors. The classical story of Deucalion and Pyrrha is but a typical example of similar myths found everywhere, and savages and fathers of the Church alike have argued that the shells, corals and other marine objects often found on the tops of mountains offered distinct proof of the historical reality of a deluge. That the Noachian deluge recorded in Scripture covered the whole earth and destroyed all mankind save one family, was the universal opinion until toward the close of the 18th century. The organic remains, on which the science of palæontology is now founded, were regarded as its wrecks, and were held to prove that it had covered every known country, and risen over the highest hills. In the progress of geology, it soon became evident that most of the stratified rocks demanded an earlier origin than a few thousand years, and the influence of the deluge was consequently restricted to the slightly altered superficial deposits; but many of these were, after a few years, found to belong to a period vastly anterior to any historical epoch, and to have been produced by long-continued and persistent agencies, differing totally from a temporary cataclysm. The story of the flood of Noah, recorded in Genesis vi–ix, is composite, being made up of two independent narratives, the Yahwe and the Elohim. The more common modern opinion regards the flood of Noah as partial and local, although the universality seems fairly enough to be implied in the biblical description, and although the old theory has been revived by writers of some authority, other noted men have argued and maintained the partial character of the flood from the absence of all record of a deluge among the black races of the world, as the negroes and Papuans, asserting that this opinion is quite consistent with the exegesis of Scripture, with tradition, and the doctrine of the Church, while it is the only theory that avoids all the ethnological and linguistic difficulties presented by the existence of the great negro and yellow races marked off so distinctly from the Noachian type. The deluge traditions of many primitive races are connected with religious mysteries, and it is scarcely true, as has often been asserted, that it is the Old Testament alone that gives a moral reason for the deluge sent upon the world. The Chaldean account discovered by George Smith presents a striking resemblance to the Genesis story, and agrees with it also in making the flood distinctly a divine retribution for human sin, although it of course differs from the Jewish account in being polytheistic instead of monotheistic. The vessel in which Xisuthros, the Chaldean Noah, sails, is a ship guided by a steersman, and others beside his own family are admitted into it. The flood is seven days at its height, and Xisuthros sends out in succession a dove, a swallow and a raven. The ship finally rests on Rowandiz, the highest mountain of eastern Kurdistan, and the peak which supports the heavens, instead of upon Ararat, the northern or Armenian continuation of the range. Babylonian tradition also confounds Noah with Enoch, for Xisuthros is taken to the skies immediately after coming out of the ark. Two deluge poems were amalgamated together in an Akkadian epic, in 12 books, describing the adventures of Gizdhubar.

Bibliography.— R. Andre, 'Die Flutsagen' (Brunswick 1901); Buckland, 'Reliquiæ Diluvianæ'; Howorth, 'The Mammoth and the Flood'; Lenormant, 'Histoire ancienne de l'Orient'; Motais, 'Le Déluge Biblique.' Compare Sayce, 'Fresh Light from the Ancient Monuments'; Prestwich, 'On Certain Phenomena Belonging to the Close of the Last Geological Period'; Vail, 'The Deluge and its Causes' (Chicago 1905); and for a careful tabulation of all the deluge stories, Winternitz, in 'Mitteil. der anthrop. Gessellschaft in Wien,' 1901, pp. 305–33.

DELUGE TABLET, or **DELUGE TABLETS,** the name given to the tablet or tablets (the 11th of the Izdubar Legends) inscribed with cuneiform writing, which being translated is found to contain the Chaldean account of the deluge. Perhaps it may have been originally Acadian. A paper on the subject was read by George Smith, of the British Museum, before the Society of Biblical Archæology, on 3 Dec. 1872, and a revised translation published in 1874. What Mr. Smith called the Flood-hero was Adra-hasis. In Bablylonian proper names compounded of two elements, either might at pleasure be placed first. Reversing the relative positions of the two elements, the name becomes Hasis-adra, which being imperfectly heard by the Greeks was by them written Xithurus or Xisuthrus.

DELUNDUNG (native name), the linsang or weasel-cat (*Prionodon gracilis*), a small quadruped inhabiting the vast forests of the eastern extremities of Java and Malacca. It is of pale yellowish-white color, with elegantly marked stripes and bands of a deep brown. It is allied to the civets, but is destitute of a scent-pouch.

DELUSIONS. A delusion is a mental state in which the mind, reasoning from definite facts, arrives at erroneous, undemonstrable, and perhaps foolish conclusions, and is unable to modify these conclusions, whatever proof may be brought to show their falsity. Thus a patient suffering from delusions may read into the actions of others ideas and conclusions relating to himself that have no basis in actual logic. Seeing several people on a corner, a man with persecutory delusions may infer that they are gathering to do him harm, or planning to deprive him of his liberty, etc. See INSANITY.

DELYANNIS, dĕl-ĭ-ăn'ĭs, **Theodoros,** Greek statesman: b. Kalavryta, Peloponnesus, 1826; d. Athens, 13 June 1905. He entered politics early in life and in his long career held many Cabinet positions. He was Minister of Foreign Affairs in the provisional government of 1862–63, Minister to France (1867); served again in the Cabinets from 1868–78; represented Greece at the Berlin Congress 1878; Prime Minister also from 1885–86 and 1890–92. While Prime Minister for the third time, 1895–97, he brought about the Græco-Turkish war, whose disastrous result obliged him to resign with his whole Cabinet. He was Premier again from 1902–05. He was stabbed by a professional gambler for the stringent measures taken by him against gambling houses.

DEMADES, dĕm-ā'dēz, Athenian orator: d. 318 B.C. Originally a fishmonger, he rose to high places in the republic. He was captured by Philip of Macedon in the battle of Chæronea, but soon set at liberty. He afterward exerted his influence in favor of the Macedonion party at Athens, but betraying Antipater, was put to death by Cassander, the son of the latter. Of his speeches, none have come down to us. A collection of sayings under the title 'Demadea' have been attributed to him. Consult Blass, 'Attische Beredsamkeit' (Vol. III, Leipzig 1887–93).

DEMAGOGUE (from Gr. *demos*, the people, and *agogos*, leader, from *agein*, to lead), one who leads or directs the people in political matters. In its original acceptation it was considered an honorable designation, and in this sense Pericles, Demosthenes and Cicero were demagogues. On the other hand, the tanner, Cleon, satirized by Aristophanes in his play of the 'Knights,' is a portrait of the personage to whom the epithet in its bad sense is applied. It is a handy nickname to throw at a popular politician with whose views you have no sympathy. Usually it means an orator or political agitator who curries popularity and power with the masses by pandering to their ignorance or prejudice.

DEMAND, a technical term in law, of comprehensive meaning. When referred to contracts it means a claim, a legal obligation, Its correlative is release, and a release of all demands is a release of all covenants real and personal, whether the conditions are broken or not, of all annuities, recognizances, obligations and contracts. Demand, in the practice of law, is a requisition made by one individual to another to do a particular thing, namely, pay some debt, fulfil some contract, release some person or property. Demands are either express or implied. Sometimes an express demand is required before action can be taken, in other cases the law requires no more than the demand implied by bringing an action. Whether an express demand is required before a plaintiff can commence action to enforce fulfilment of a contract depends upon the express or implied stipulations of the parties to the contract. When no date is given in a contract for its fulfilment, whether in the case of a promissory note, or in the contracting of a debt, the payment of the obligation is due on the present day, or immediately on demand. It is requisite, in some cases arising *ex delicto*, that is, in some criminal cases, to make a demand for the restoration of the right before the commencement of an action, or, for instance, when the wife or other member of the plaintiff's household has been enticed away, in order to constitute the party a wilful wrongdoer, a demand for restoration must be made. When property lawfully obtained possession of is unlawfully detained, or converted, a demand for the delivery of its possession to the owner is requisite before an action can be laid. When an order to pay, or to do something has been made a rule of court, a demand for the payment of the money, or performance of the thing must be made before an attachment will be made for contempt. In like manner, before action can be taken for breach of promise of marriage, a demand for marriage must be made by the plaintiff, unless the defendant has married another person, or has refused to marry at any time. See CONTRACT; RECOGNIZANCE; RELEASE.

DEMAND AND SUPPLY, in political economy, the desire for services or utilities on the one hand, and the production or offer of them on the other, which tend to complete an act of exchange. Demand is therefore the amount of a commodity that will be taken at a given price; supply the amount that will be offered at a given price. Demand is commonly said to be relative to supply, but in reality it is reciprocal to it. Certain political economists qualify the term demand by the word effectual, but it is scarcely necessary to make such a limitation. A mere desire for objects has no commercial significance, but that desire simply which contemplates a mutual benefit. Thus the wish of a beggar to possess a diamond cannot affect the price of the article, as he can offer no desirable object in return. The intensity of demand, and the consequent effect upon values, will be proportionate to the necessity which exists for satisfying the demand. Different rules, therefore, will apply to the increase of price consequent upon increased demand and reduced supply in articles of voluntary use, and to the same rise in price when affecting articles of necessary use. The demand for the latter class of utilities is constant, and a deficiency in supply cannot be met by abstinence, except to a scarcely appreciable degree, whereas any considerable deficiency in the supply of articles of voluntary use is to some extent met by economy. Prices will, therefore, increase in different ratios according to the degree in which the commodities demanded are necessary or convenient. Thus the price of grain may rise, in the case of a bad harvest, from 50 to 100 per cent; cotton or wool, in similar circumstances, would certainly fluctuate, but not to anything like the same extent; wine would vary in price least of all; the deficiency in the last two commodities being artificially restored by the decrease of demand consequent on economy and abstinence. In recent economic theory the law of demand and supply is accepted as a preliminary step, but chief interest is held to centre in the forces underlying demand and supply, such as cost of production, etc. See POLITICAL ECONOMY.

DEMARATUS, Spartan king. He succeeded his presumed father, Ariston, about 516 B.C.; but lost the throne, partly in consequence of a quarrel with his colleague Cleomenes, and partly on account of doubts which had been cast upon his real parentage. He retired into private life; but having afterward become a magistrate, was sitting in that capacity at the Gymnopædian games when Leotychides, who had supplanted him as king, sent tauntingly to ask him how he felt in a secondary place after having occupied the first. The boldness of his reply forced him to take flight, and he passed over into Asia, where he was well received by Darius. He afterward accompanied Xerxes as councillor on his expedition against Greece.

DEMARCATION, Line of, the boundary established 4 May 1493 by Pope Alexander VI, who assigned to Spain all the lands she had discovered or might discover west of a line running from the North pole to the South, distant 100 leagues west of "any of the" Azores and Cape Verde Islands (provided such lands had not been in the actual possession of any other Christian king or prince up to the preceding Christmas), and to Portugal, on the same conditions, all the territory she had discovered or might discover east of the said line. The governments of the peninsula held that the Pope had sole and absolute authority to dispose of all countries inhabited by heathen peoples; moreover the papal bull *inter cætera* of 4 May 1493, forbade all persons without special permit to go "for the purpose of trade or any other reason" to the islands and mainlands thus granted exclusively to Spain and Portugal. After this territorial concession had been made, Portugal's possessions in the eastern hemisphere were called the East Indies, and those of Spain in the western hemisphere were called the West Indies. An extension of the papal gift of the Indies was made in the bull dated 25 Sept. 1493. A dispute arising in regard to the position of the line of demarcation, the two countries concerned sent commissioners to the Spanish city of Tordesillas, and on 7 June 1494 the commissioners agreed that the line should pass, north and south, 370 leagues west of the Cape Verde Islands. On the strength of this agreement, Portugal claimed and secured the eastern part of South America (see BRAZIL). After the *Victoria* returned to Seville (1522) from her voyage to the Moluccas, and so round the world, the Portuguese accused their rivals of having broken the treaty of Tordesillas. The Spaniards in reply said that the Spice Islands (Moluccas) were not within the limits of the Portuguese territory. To settle this important dispute, a congress was convened at Badajoz in 1524. Commissioners of both countries were in attendance — Fernando Columbus, Sebastian Cabot and others. The two main points to be decided were: (1) Whether the line of demarcation should be drawn at the stated distance west of the western or eastern limit of the Cape Verde Islands; and (2) where it would pass on the opposite side of the earth. This Badajoz junta failed to come to an agreement "owing to the Portuguese experts, who could not overcome this dilemma; If the line was pushed more to the west, Portugal would gain a greater part of Brazil; but she might lose all rights over the Moluccas, as the line, of course, had to be carried to the other hemisphere as well." The treaty of Vitoria, signed 19 Feb. 1524, provided that, inasmuch as some doubt existed between the sovereigns of Castile and the king of Portugal as to the possession and ownership of the Moluccas, there should be appointed by each one of the parties to the treaty "three astrologers and three pilots, and sailors, for the determination of the demarcation.» A treaty negotiated at Saragossa and signed by representatives of the Spanish and Portuguese monarchs 22 April 1529 fixed the line of demarcation 297½ leagues east of the Moluccas, Spain selling for a stated sum whatever rights she had formerly claimed to possess in the Spice Islands, and agreeing for the future practically not to colonize, and expressly not to «trade there in any manner whatsoever.» It did not seem necessary at that time to raise the question as to the location of the line in the New World, though it is plain that if the circle thus «determined from pole to pole» in the east had been logically completed, Portugal would have been excluded from the South American continent. The bearing of this matter upon Spanish rights in the Philippines is of special interest. The Molucca Islands, the Philippines, and, indeed, the western half of Australia lay within the Portuguese assignment, as a matter of fact. Therefore the principal Spanish settlements and explorations in the Far East appear to have been made in contravention of Portugal's treaty rights. A dispute over the southwestern boundary of Brazil in the 18th century resulted in the abrogation of the line of demarcation and all agreements based thereon by a treaty of 1750. This treaty was also abrogated in 1761 and all disputes involved were at length settled by a new treaty in 1779. The other nations of Europe paid little regard to the papal bull. Consult Blair and Robertson, ‹The Philippine Islands,› (Vol. I); Harrisse, ‹The Diplomatic History of America› (New York 1898); Dawson, ‹The Line of Demarcation of Pope Alexander, etc. . . . with an inquiry concerning the Metrology of Ancient and Mediæval Times,› (in Proceedings of Royal Society of Canada, 1899); Bourne, ‹Essays in Historical Criticism› (New York 1901).

Marrion Wilcox.

DEMAREST, William Henry Steele, American educator: b. Hudson, N. Y., 12 May 1863. He was graduated at Rutgers College in 1883 and from the New Brunswick Theological Seminary in 1888, when he was ordained minister of the Reformed Church in America. He held pastorates at Walden, N. Y., 1888–97, and at Catskill, N. Y., 1897–1901; in the latter year he was appointed professor of church history of New Brunswick Theological Seminary. In 1906 he was made president of Rutgers College.

DEMAS, a fellow-laborer with Paul and mentioned in the New Testament three times. (Col. iv, 14; Philemon xxiv; 2 Tim. iv, 10). In the last passage he is described as having deserted the Apostle in his hour of need, when Paul was waiting for his trial before Nero, because «he loved this present world.» He went to Thessalonica which may have been his home town, it is thought. He probably never returned to his faith, for by tradition he is classified among the apostates to the faith. John Bunyan uses his name and character as a warning in his ‹Pilgrim's Progress.› The word Demas-like, is a word applied to a traitor who is tempted by his greed to desert his good cause.

DEMAVEND, dĕm-a-vĕnd', a volcanic mountain, now extinct, of Persia, and the highest peak of the Elbruz chain, 45 miles south of the Caspian Sea, and about 40 miles northeast of Teheran. Its height, according to the most reliable measurement, is 18,464 feet. At a distance the mountain has the form of a smooth cone, and appears to slope evenly from top to bottom at an angle of 45 degrees. The cone terminates in a crater of 85 yards in diameter, and is nearly surrounded by jagged rocks, composed partly of basalt and partly of limestone and sulphur. This sulphur is an article of commerce. The basin within is almost entirely filled with snow. Around the base are many hot springs. William T. Thompson was the first European to ascend Demavend (1837).

DEMBEA, dĕm'bē-ą or dĕm-bē'ą, or **TZANA,** a lake of Abyssinia, in the western part of the country. It is about 50 miles long and 6,000 feet above the level of the sea. It contains many islands, one of which is a place of confinement for state prisoners. The Bahr-el-Azrek, the Abyssinian Nile, flows through it.

DEMBINSKI, dĕm-bĕn'skē, **Henryk,** Polish general: b. Strzalkow, near Cracow, 3 May 1791; d. Paris, 13 June 1864. Entering the Polish army in 1809, he aided in the French invasion of Russia three years later and was made captain by Napoleon at Smolensk. In the year 1825 he became a member of the Polish Diet, where he cast in his lot with the opposition party. On the outbreak of the revolution in that country (1830), he was made brigadier-general, and in the following year was nominated governor of Warsaw and commander-in-chief of the Polish army. On the fall of Warsaw in September into the hands of the Russians, Dembinski made his escape to France. From 1833–35 he was in the service of Mehemet Ali of Egypt. The Hungarian Revolution of 1849 once more offered him a field for his activity, and he was appointed by Kossuth commander of the insurgent troops. He had the misfortune to lose the battle of Kápolna, and resigned his command, but consented to act under Görgei. After the capitulation signed by the latter at Villagos, and the resignation of Kossuth, Dembinski fled to Turkey. He returned to France in 1850 and began his ‹Mémoires› of the Hungarian War. Consult Danzer, ‹Dembinski in Ungarn› (Vienna 1873).

DEME, dēm, a subdivision of ancient Attica and of modern Greece. The dēmoi were townships or hundreds, subdivisions of the phulai, and were equivalent to the Dorian *komai*, Latin *pagi*. The word really meant a country district, or a common name for divisions of the country, and in the time of Herodotus they were 100 in number in Attica (10 in each phulē), afterward 170; their origin was commonly referred to Theseus. The government of the deme was by a presiding officer, treasurer, controller and assembly which carried on the public business of the deme. Membership was hereditary, regardless of the location of the actual residence of the member. The word dēmos early came to be applied to the common people, and survives significantly in our «*democracy* and *demagogue*.» Consult Leake, ‹Demes of Attica› (London 1820).

DEMENTIA PRECOX, a term used in psychiatry to designate a disorder group characterized by certain types of mental deterioration or disintegration. This term originated with Kræpelin, professor of psychiatry at Munich. Clouston of Scotland termed the disorder the «insanity of adolescence,» and Bleuler of Zürich has used the term «schizophrenia.» Thus from the terms alone a brief description can be formulated — a mental disorder, chiefly occurring in adolescence or young life, characterized by a splitting of the psyche «schizophrenia,» and usually leading to a precocious dementia, or mental breakdown. This mental disorder is the most frequent of all of the psychoses, constituting fully 30 per cent of the admissions to hospitals for mental diseases. In some individuals it runs a comparatively mild course — recovers, or becomes chronic, this last individual being called «eccentric,» «bizarre» or «very peculiar.» On the other hand it may run an exceeding violent and furious course — the patient being wildly maniacal, with active delirium accompanied by hallucinations. These patients may die in a delirium from exhaustion or they recover — or the process quieting down leads to a more chronic mild deteriorating process, marked by episodes or outbursts of unruly or disorderly conduct. These types of chronic dementia precox cases make up the vast majority of the mentally ill in the State hospitals for the insane of the country. The chief feature that characterizes dementia precox is the tendency for the patient to make use of *autistic thinking.* That is the individual withdraws his interest from the external world [introverts] and constructs a phantasy world into which he tends to withdraw more and more. At first this type of thinking detaches him only partially from the world of reality. He is able to come out of his «day dreaming» as it were — but as the introversion of his phantasy life becomes more and more pronounced the splitting between his phantasy world and the real world becomes too great to be bridged. When this occurs the individual is «sick.» The early stages of this process are marked by a lack of interest taken by the potential schizophrenic in his surroundings. He is apt to lie in bed all the morning or all day, uninterested or only mildly interested in the newspapers or books. He fails to move about or does so in a listless halfhearted manner. There is a failure of voluntary attention and a lack of sociability. There may be some keenness of interest but it is largely on the internal phantasies. Hence they seem heedless of what is going on about them, may lose themselves in their abstractions, may wander about aimlessly. In this stage many take up a tramp or hobo existence and are able to get along in this haphazard, indifferent, lazy sort of manner, without many obligations and living from hand to mouth. In others there is a greater disintegration — the lack of unity of the personality commences to show in the development of certain trends which have been called the [a] hebephrenic, [b] catatonic and [c] paranoid types of the disease process. [a] The hebephrenic types show a gradual dilapidation of interests. They make up the simpler types of the disease. They show a number of additional somatic or bodily signs. Headaches are frequent, irritability and failure of concentration, with gastro-intestinal disturbances, are prominent. They sleep badly and in this phase are often diagnosed by the unskilled physician as subjects of «nervousness,» or «neurasthenia» or «nervous breakdown.» Some are mistakenly treated for «stomach trouble,» or other bodily disease until the mental disorder passes into a further stage of evolution. These patients then are apt to develop «flurries.» They become excited, confused, congested. They do not sleep, cannot work, go aimlessly here or there, become fussy, possibly go on a «tear»— get intoxicated, create a disturbance, commit some moral infraction or sexual delinquency and land in the police station or hospital where the mental nature of the difficulty may be apparent. All this may have been in the making a month, a year or two — each individual case varying greatly. Depression or silly conduct may mark the gradual development of these breakdowns. The ideas which some express become more and more bizarre. They frequently hear voices — are having telepathic communications. Some of these patients believe themselves clairvoyants, can read the stars, or what people are thinking. The train of thought commences to get loose, they commence to become foolish or fantastic in their speech. They repeat things over and over again. They nearly all become resistant and negativistic — they are all «from Missouri.» One offers to shake hands, they pull back. «Show the tongue!», as a request of the doctor, is met with shut teeth. If they talk much they later tend to develop a gibberish all of their own. A «word salad» is a type of this which consists of a regular hash of different ideas, all of which may be expressed in the most matter of fact and apparently sensible manner. The patient acts as if it were quite logical. These simple demented and hebephrenic types go on to delusional expressions of a most bizarre type. These delusional ideas are often based upon the hallucinatory voices or feelings. These are all internal wishes—their own phantasy formations—but which are referred to their organic sensations or to the external world. They *project* their wishes upon the body or externally upon people. Thus a strong desire to masturbate will be interpreted as some one else putting the X-ray upon the genitals. Other types of misinterpretation are frequent. These hebephrenic types gradually get more and more involved in themselves and finally are found in institutions sitting about the wards, muttering to themselves, or monotonously walking up and down, grimacing or gesturing or making some bizarre series of movements. They are unapproachable, their detached personality is inaccessible to ordinary modes of contact and they live a life apart from the rest of the world. They carry out the idea of the old Greek philosopher, Protagoras, who said «It is only when we do not act at all we can differ utterly from all others and live our own private life apart.» These patients have separated themselves from the social herd and live in their own phantasies. From the external point of view, and from the standpoint of logical thinking, their productions are meaningless and «crazy,» but if one can get within the wall of their phantasy life, one can learn that from the ego point of view their system is quite logical. It is like a foreign language they use which if the key be found, the thought life of these patients can be interpreted and may be adjusted to reality — especially if they are studied before the fragmentation of the personality has gone too far. [b] In the catatonic types the symptoms just described are also found — but in addition there is a greater amount of motor activity. The muscles are more tense. The patients hold themselves stiffly. They stick out their chests, or hike a shoulder, or constantly show unique or queer mannerisms. Some will stand in one position for hours, days or even weeks. Some patients are known to lie rigid in bed for years, not moving — stomach tube fed, mute and absolutely resistant and with eyes closed, oblivious to everything. Heat or cold, hot irons or ice, no amount of torture can make them move. In the days of the mediæval tests for witches or devils some of these patients stood most surprising tortures without flinching. They will say the same thing over and over again — «Locks and keys — keys and locks — locks and keys — keys and locks» one patient will repeat six to seven hours without cessation. Some walk backward and forward a certain invariable number of steps — «Stereotypy.» Again the catatonic type of patient will become violently excited, rush aimlessly here and there, into things, through windows, pound on doors, or attack people with chairs or sticks with enormous violence. This fury may be frightful, occasion a high temperature and a host of physical symptoms, or the patient will go into a stupor and lie comatose for weeks or months — absolutely negativistic to every call of nature, refuse to empty their bladders or move the bowels. Saliva may accumulate in the mouth and even decompose without their regard. In a few cases, after it may be months of stupor, these catatonics will suddenly get up, appear perfectly normal and, surprising as it may appear, may know everything that happened about them for months, during which time they lay apparently oblivious to their surroundings. More often, however, they pass into a chronic stage of dementia or die from an acute meningeal suffusion — «Catatonic brain death.» [c] The paranoid forms seem to come off the best in their conflicts. They split the least as it were. They construct a fairly logical system of defense. They find an external cause for their internal wishes and by this *projection* mechanism are able to get along fairly well in the social world. Only when they commence to react violently to these external sources of irritation are they made the subjects of detention, of incarceration. A large number of mild types are to be expected. Many inventors, reformers, religious zealots, quacks, litigious and vindictive individuals approach this group or slide into it in varying degrees. Most frequently the delusional attitudes are sexually colored. The most common is that certain men or women are following them or conspiring against them to ruin them, or degrade them. Various secret societies are banded against them. Cliques and political parties are hampering their activities. Certain of these patients are constantly seeking vindication for certain fancied wrongs. Their reputations are being assailed and they must protect them. Others must right all the wrongs of others, especially political wrongs and hence become assassins or regicides, etc. Others are religious fanatics and would make what is symbolic, real. To take the blood of the «Savior,» in a symbolic sense, is not sufficient. They must have actual blood and hence kill to satisfy their pathological sadistic wishes. Certain sadists and masochists belong in this paranoid type of dementia precox. These are often remarkable for their apparent lucidity of thought and clear logical capacities. In the paranoid type the fragmentation of the personality is the least marked and hence there is a greater coherency of the personality. Thus many of this type of mentally disordered individuals are rarely recognized by the layman to be sick. They are often thought of as difficult people to get along with, especially in the family circle, but to the average outsider they are rarely considered sick. They may even occupy important positions in the community and yet be very seriously and severely sick. Under the term «monomania» a number of this type were classed by former students of mental disorders.

Nature of Dementia Precox.— From this abbreviated description it may be pointed out that it presents correlations on the one hand to the more distinctly so-called psychogenic types of disorders, such as the psychoneuroses, and on the other hand to many of the more distinctly somatic diseases, (various chronic disorders). It is possible to formulate the mental symptoms in a way that they are formulated in the psychoneuroses. The mental symptoms are capable of interpretation at a psychological level. On the other hand, it can be seen that recent investigations are tending to show more and more that there are distinct biochemical disturbances during life and pathological changes are being found after death. In any case the acute cases that lead to death must be conceived as having profound bodily changes correlated with psychical symptoms. The formulation of the disease process from either standpoint alone must of necessity be unsatisfactory. For example, the toxic theory of the etiology fails to give a comprehensive idea of why the mental manifestations take the particular form they do, why for example, an hallucinatory voice which a patient heard should be that of a young woman whom the patient had seduced, «telling him to lead a decent life.» This is the patient's self-critique appearing in hallucinatory form. It would seem, that when the type of splitting of the personality is very severe then the term dementia precox or schizophrenia applies. It is possible that the somatic processes, whatever they may be, aid in this deeper regression to the infantile and the archaic in the individual and therefore have been less efficiently sublimated and thus permit the older phylogenetic thought symbols to appear in conduct. At any rate, it seems quite evident that the greater difficulty of conception here is due in part to the quite arbitrary separation of the individual into two distinct and mutually exclusive parts, namely mind and body. The dualistic hypothesis that conceives of the mental and the physical going side by side without mutual interference or interaction is responsible for such a conception. From the medical standpoint such a concept seems entirely unnecessary, for one is met at every turn with the intimate relations constantly maintained between the body and the mind, and therefore comes naturally to consider the human being as a biological unit presenting types of reactions that at one extreme are predominantly psychic, while at the other they are predominantly physical, but which present every grade of intermediary type. The severe mental disturbance of the nature of anxiety that goes with certain cardiac and pulmonary diseases is well known, as are also the physical upsets, particularly the gastro-intestinal, that are associated with certain mental conditions such as worry. The interrelations between the mental and the physical are a matter of daily observation. Occasionally, however, they are very pronouncedly emphasized. The following case, cited by Jelliffe and White, is an instance. "A chronic patient who had been for many years in a hospital, working daily at outdoor labor, was suddenly seized with a violent impulse in which he attacked all about him. He seized a heavy iron bar, killed two people and injured another, and ran headlong and wildly without direction into the woods. He was finally cornered, and in the process of securing him he was shot by a farmer with a load of buckshot, none of which, however, penetrated farther than through the skin and produced no serious wounds. He was brought back to the hospital, incoherent, mumbling and trembling, showing all the evidences of a tremendous emotional upset. The shot were picked out of his skin, the wounds were dressed and he was put in bed. Up to that time he had been a strong, physically healthy negro. He never left his bed again, and approximately a year afterward he died, having developed an acute tuberculosis. Such cases as these demonstrate the necessity of considering the human being as a unit and not endeavoring to draw hard-and-fast lines of distinction between the mind on the one hand and the body on the other." In the present state of knowledge, however, one is often unable to make any specific correlation between the physical findings and the mental symptoms, while on the other hand it is quite possible to express the symptomatology of the disease, to describe it, to, so to speak, reconstruct the psychosis purely in psychological terms. For the present, therefore, the disease must be described psychologically, and the explanation of the mental symptoms must be sought psychogenetically, without, however, forgetting that there are certain somatic changes which are pretty generally attached to the symptomatology of the disease process and which must ultimately be made to fit into the general rubric before a complete understanding of the entire situation is had. On the psychological side, then, dementia precox is seen to be a certain type of reaction to a mental conflict, resulting in a splitting of the psyche and the outcrop of unconscious mental trends to the surface of the mental life. The patient is confronted with a situation to which he cannot quite adjust himself which is absolutely inacceptable and impossible, and he is therefore driven away by his incapacity to assimilate it and cast back upon himself. The battle of the opposing forces produces the disease picture which is the outward evidence of the effort on the part of the individual to reach a solution of the difficulty. The symptoms are the result of the appearance of the unconscious trends distorted and disguised as they are in dream formations. Jung has especially noted this similarity to the dream state and would consider dementia precox as a sort of waking dream or dream from which the patient does not awake, the dream picture being fixed as it were.

The psychological side of the situation, however, as may be seen is not all. There are certain physical changes in the course of the disease and certain pathological findings. So far as the observation goes, however, the etiological factors lie almost, if not quite entirely, in the mental sphere, and one must therefore conceive of the physical changes as superadded. This is a possibility which was well illustrated by the case already quoted of the man who died after a tremendous emotional explosion, during which he killed two people. When the psychic splitting is profound and when it is of considerable duration, it is quite understandable that it should unloose bits of physiological mechanism and thus produce the physical changes found. From the descriptions of the mechanisms in the psychoneuroses, taken in connection with what is known of the vegetative nervous system, it may be seen that constantly operative psychic disturbances are capable of producing the physical changes.

Ways of Getting Well.— With the concept of the disease process which has been previously elaborated, what is the significance of the three main types of precox which are found clinically? Bertschinger has recently made an admirable study of the process of recovery in dementia precox and his discussion of the nature of the conflict and the ways of adjusting is particularly illuminating. The three clinical types of the disease are the expression of the interplay of the two factors, the conflict and the reaction, the severity of the former and the efficiency of the latter determining the outcome in the individual case. The degree of confusion in the acute onset is an expression of the completeness with which the patient is driven back from reality and the dominance of the unconscious trends. Conditions of moderate confusion with capacity for adequate reaction to reality at times, or under the special stimuli of, for example, questions, show that the patient still has a certain grip upon the real world and is making an effort at least to retain it. Certain other cases of quite clear consciousness with complete orientation show a very adequate grasp upon reality, and these patients, to the casual observer, often seem quite natural. In such patients, however, one will notice interference of thought, hesitations in the course of conversations, stutterings and stammerings over certain points, the evidences, in other words, of complex interferences, and the patients will complain that from time to time their minds seem to be absolutely blank. These saltatory associations and thought deprivations are the expressions of reactions to buried complexes, so that in these patients there is a fairly adequate grasp upon reality for ordinary purposes at least, with only spasmodic influences from relatively restricted areas. In general, then, the hebephrenic type may be seen to be a reaction to the conflict which is essentially inadequate and inefficient. In the acute stages the patient may be absolutely overwhelmed by the conflict, disoriented and confused. Later on the progressive disintegration and dilapidation of thought indicates the slowly progressive conquering of the capacity for adjustment to reality by the invasion into consciousness of the unconscious trends. The catatonic type represents a somewhat different form of reaction. Here the patient is oftentimes suddenly overwhelmed by the conflict, as under circumstances of accident or sudden and severe shock. No attempt at adjustment is made at first, but the whole situation is actively and definitely shut out. Here there is an active effort on the part of the individual to exclude the offending tendencies, and when this succeeds recovery takes place as the result, so to speak, of the encapsulation of the objectionable material, and its exclusion from consciousness. This form of the disorder is the most acute, and the recovery is equally most apt to be prompt, and it will be seen from this explanation why this is so. In the paranoid form of the disorder the reaction is much more efficient than in the hebephrenic variety, and in some respects less efficient than in the catatonic. Here the individual takes a flight into a psychosis, and the delusions are the expression of a compromise between the opposing psychic trends. Unable to live in the real world, the patient succeeds in inventing a world in which he can live, and having invented it he succeeds in getting along fairly well without noticeable deterioration. The conflict in these cases tends to become stationary after the development of the delusional world. Bertschinger has more especially defined the ways of getting well by pointing out that the patient in recovering may, as a result of the conflict which he cannot adjust, find a compromise by changing himself and interpreting the world of reality in terms of his morbid phantasy, or by translating the world of his phantasy into terms of external experience. And so one would find on the one hand delusions of grandeur which are a compromise formation and serve to change the individual so that he may be better satisfied with life, and on the other hand one finds delusions of persecution, the delusions of influence from the outer world, that serve to change the outer world in conformity with the patient's complexes. These outside influences are but the reflections back upon the patient of his failures to get from the world what he wants, and they are consequently felt as malign and destructive influences. Another method of getting well is that already described of the catatonic, the shutting out and walling off of the conflict in a circumscribed forgetfulness. In many cases conversions into bodily symptoms, such as are found in hysteria, are found. Another method of getting well is by living through a series of imaginary experiences which brings the complex to a logical conclusion. For example: A young Japanese woman was overwhelmed by the sad news that five members of her family had been killed in battle. She passed instantly into a dreamy state of consciousness, went on with the work of the household just as if all five were members of it, made their beds, set their places at table and acted in every way as if they were alive and present. Finally she, so to speak, let one of them die and then another and another until finally she had compassed the death of all five, after which she awoke from her dream-like state and was well. She had succeeded in an efficient reaction to the situation by its attenuation, extending it over a considerable period of time. Finally, a certain number of patients get well by the final domination of the reality motive, with a resulting correction of their delusional phantasies.” These patients are best helped by psychoanalysis when they are capable of establishing mental contacts with the physician. As a rule they are treated foolishly for bodily diseases too long and the mental disintegration goes too far for possible skilled intervention. They then are left to their own devices. Appendicitis used to be treated in this way for centuries, but now prompt surgical intervention saves thousands of lives. Early psychoanalytic treatment will help the dementia precox patient. Consult Jelliffe and White, ‘Diseases of the Nervous System’ (2d ed., 1917); Bleuler, ‘Die Schizophrenie’ (1911).

SMITH ELY JELLIFFE.

DEMERARA RIVER, British Guiana, rises in the unexplored mountains of the interior, flows northward and empties into the Atlantic at Georgetown. It is navigable for small vessels to a point about 150 miles above its mouth. The estuary of the Demerara forms a moderately good harbor. See GEORGETOWN.

DEMESNE, dę-mēn′, or **DOMAIN** (in French *domaine*), in its popular sense, denotes, under a feudal aristocracy, the lord's domain, his manor place, with the lands thereto belonging. In England the demesne of the Crown denotes either the share reserved to the Crown in the distribution of landed property at the time of the Conquest (ancient demesne), or such as came to it afterward, by forfeitures or other means. They are at present contracted within a very narrow compass, having been almost entirely granted to private subjects. The rents and profits of the demesne lands of the British Crown are no longer kept separate, but are incorporated with the ordinary revenue. See CIVIL LIST.

The alienation of the domains in France, rendered necessary to reward powerful supporters, was the main cause of the fall of the Carlovingian dynasty. The succession of the Capets was likewise due to their great possessions, which rendered them the most powerful nobles in France. The policy of this house, particularly of Louis XI of the Valois branch, in despoiling the great nobles, made them at length absolute masters of the kingdom, although at first their authority, beyond their own domains, was very feeble. The despotic power of the French monarchy reached its climax under Louis XIV, the most powerful of the Bourbon branch of the family. The nobility had now lost nearly all its feudal privileges, and could easily be rewarded by places at court, appointments in the public services, and pensions out of the national revenue. Napoleon, who endeavored as much as possible to revive the traditions and institutions of the monarchy, had also a *domaine extraordinaire* (law of 30 Jan. 1810), which consisted of his acquisitions by conquests, and were kept entirely at his disposal; these supplied the means of donations to his generals, etc. The *domaine extraordinaire* was likewise retained by the Bourbons (law of 22 May 1816). The administration of these donations was conducted with great wisdom; and Napoleon, as Las Casas relates, dwelt with pleasure on this branch of his government.

DEMETER, dĕ-mē′tėr, one of the twelve principal Grecian deities, the great mother-goddess, the nourishing and fertilizing principle of nature. She was the daughter of Cronos and Rhea, and mother of Persephone (often called Cora, the Maiden, the Proserpine of Roman mythology), and according to Hesiod, of Dionysus (Bacchus). By the Romans she was identified and worshipped with Ceres. See CERES.

DEMETER, Dimitrija, dē-mĕ'tėr, dē-mē-trē'zhä, Croatian dramatist and poet: b. Agram, 21 July 1811; d. there 24 June 1872. His principal dramas are: 'Love and Duty'; 'Blood-Revenge'; and the tragedy 'Teuta.' He wrote a lyro-epic poem, 'The Battlefield of Grobnik,' and several stories. He translated several foreign dramatic works into Croatian.

DEMETRIUS I, surnamed **POLIORCETES,** king of Macedonia: d. Pella, Syria, 284 B.C. He was defeated at Gaza by Ptolemy in 312, and shortly after defeated Cilles in Syria. He appeared before Athens with a fleet, and restored to the people their ancient form of government (307 B.C.). After defeating Ptolemy in a naval battle at Cyprus he attempted to besiege Rhodes, but was unsuccessful. Having lost the battle of Ipsus against Seleucus, Cassander and Lysimachus (301 B.C.), he fled to Ephesus, and passing over to Corinth, embarked on an expedition against the Thracian dominions of Lysimachus. He then went to Asia, to bestow his daughter Stratonice in marriage on Seleucus, and on his way took possession of Cilicia, by which his friendship with Seleucus was broken off. He conquered Macedonia (294 B.C.), and reigned seven years, but lost this country by his arbitrary conduct. He surrendered to Seleucus and remained his prisoner for the rest of his life.

DEMETRIUS II (called «Nicator»), king of Syria: d. 126 B.C. Ptolemy Philometer, king of Egypt, placed him on the throne of his father, after expelling the usurper, Alexander Balas, 146 B.C. He married Cleopatra, the wife of the same Alexander, and daughter of Ptolemy. About 138 he was defeated and taken prisoner in an expedition against the Parthians. Restored to his throne about 128 he was overthrown by a pretender. He committed suicide at Tyre.

DEMETRIUS, or **DMITRI,** a series of impostors who usurped supreme authority in Russia, and led to some of its remarkable revolutions. Ivan Wasiliewitch, who had put his eldest son to death, left the throne in 1584 to another son, Feodor, whom Boris Godunov entirely supplanted in his authority. Ivan had left another son, Dmitri, by a second marriage; and Boris, fearing that he might one day prove a formidable obstacle to his ambitious projects, made way with him, but no one exactly knew how. Shortly after, in 1598, Feodor died, and Boris took possession of the throne. Mystery still hung over the fate of Dmitri, and Grishka or Gregory Otrepieff, a monk belonging to the convent of Tehudov, determined to turn it to account. Several persons had been struck with his resemblance to Dmitri, and he at once explained the fact by declaring that he was Dmitri indeed, and that the design of Boris to murder him had been frustrated. The report quickly spread and Otrepieff fled into Poland, where Sigismund III, king of Poland, who saw in him a useful instrument for introducing Polish influence into Russia, aided him to enter that kingdom at the head of a body of troops. Boris was deserted by his soldiers, and ended his life by poison. Otrepieff in 1605 entered Moscow in triumph, and, as the genuine son of Ivan, was proclaimed grand duke of Russia. He was now firmly seated on the throne, and might have transmitted it to his descendants had he governed with prudence. Conspirators, after exciting a tumult, forced their way into the palace and put the false Dmitri to death. His body was exposed to public view, but in such a state that its features could not be recognized; and a rumor of his being still alive having spread, another impostor quickly appeared to personify him. The Poles espoused the cause of the second false Dmitri, and had made it triumphant, when he was assassinated in 1610 by the Tartars whom he had selected as his body guards. A state of anarchy ensued, and continued for nearly half a century, during which a number of other false Dmitri appeared in different quarters. Consult Munro, 'The Rise of the Russian Empire' (London 1900); Kostomaroff, 'Les faux Dmitri' (Petrograd 1864).

DEMETRIUS PHALEREUS, fa-lē'rōōs, Greek orator and philosopher: b. Phalerum, Attica, about 345 B.C.; d. about 283 B.C. He was made Macedonian governor of Athens (317 B.C.) and archon (309 B.C.), and embellished the city by magnificent edifices. The gratitude of the Athenians, over whom he ruled, erected him as many statues as there are days in the year, but these were afterward scornfully broken, and he himself condemned to death by that fickle people. He fled to Egypt, where he is said to have promoted the establishment of the Alexandrian Library, and of the museum, the superintendence of which Ptolemy Lagus entrusted to him. Under Ptolemy Philadelphus, he fell into disgrace, and was banished to a remote fortress, where he died from the bite of an asp. Demetrius was among the most learned of the Peripatetics, and wrote on several subjects of philosophical and political science. But the work on rhetoric, under his name, probably belongs to a later age. Consult Wright, 'A Short History of Greek Literature' (New York 1907).

DEMETZ, dė-mäts', **Frédéric Auguste,** French philanthropist and prison reformer: b. Paris, 12 May 1796; d. there 22 Nov. 1872. He was judge, vice-president of the chamber of correctional police and court councillor. He founded, in 1840, the penitential and agricultural Colony of Mettray for juvenile delinquents, devoting himself wholly to this establishment, which has served as a model in France and elsewhere. He was elected corresponding member of the Academy of Moral and Political Sciences, Paris, in 1864. He wrote many essays and reports upon penitentiary methods and reforms. Among the latter were 'Rapports à Monsieur le Comte de Montalivet sur les penitenciers des Etats-Unis,' a study of United States' penitentiaries which he undertook for the French government in 1836.

DEMI-MONDE, Le ('The Outer Edge of Society'), by **Alexandre Dumas the Younger,** was written in 1854, and, after troubles with the censorship amusingly recounted in a preface, acted and published in 1855. By «demi-monde» Dumas says (Preface, p. 11) he means not courtesans, to whom this phrase of his coining is often misapplied, but the semi-society of unclassed women of respectable stock, whose loss of full social recognition had love for its sole cause, with some recruits whose talents have gained them a semi-respectability and others from among the foreign residents. This society, he says, is not for everybody. "One is banished from the 'demi-monde' for selling herself, as one is from the 'monde' for giving herself away — It begins where the legal consort ends and ends where the venal consort begins," or, as his Olivier puts it (Act II, Scene 8, p. 103), "The first woman who was turned out of doors hid and lamented her fault in the darkest retreat she could find; the second went to look for the first and they learned to call fault 'misfortune,' crime 'error,' to console and excuse one another. When they were three they asked one another to dinner. When they were four they had a quadrille. Then there gathered around them girls who had made a false start in life, sham widows, women who take the names of the men with whom they live, some legal couples who have spent supernumerary years in a liaison, in short all women who want to make believe that they have been somebody and do not wish to appear what they are." In construction the play is faulty, its denouement is a piece of dramaturgic legerdemain. The scheming Suzanne d'Ange, overreaching herself, throws away her hope of rehabilitating herself through marriage with the soldierly Raymond de Nanjac, while Marcelle's straightforwardness wins hand and heart of Olivier le Jalin, the exponent throughout of Dumas' ideas. But this is of less interest that the keen insight shown in the satiric portrayal of a social class more clearly defined in the Paris of its day, than since divorce has gained greater social recognition in France.

BENJAMIN W. WELLS.

DEMI-RELIEF, or **DEMI-RILIEVO**, rĕ-lē′vō, a term applied to sculpture projecting moderately from the face of a wall; half raised, as if cut in two, and half only fixed to the plane. Mezzo-rilievo, which is the more correct term used to designate this style of sculpture, is lower than alto-rilievo and higher than basso-rilievo.

DEMIDOV, dĕm′ĕ-dŏf, or **DEMIDOFF**, a noble Russian family, whose head, Nikita Demidoff, was an armory-founder at Toula. This Demidoff was entrusted by Peter the Great with the business of casting the cannon for that prince's numerous warlike expeditions. He actively seconded all the exertions of the tsar, by whom he was ennobled, and in 1725 discovered the mines of Kolyvan, the working of which speedily enriched him. He left a son, Akinfiy, and several grandsons, who distinguished themselves in the same career as their progenitor and amassed colossal fortunes. The best known of these are Prokop Demidov, who worked with great profit the iron, copper and gold mines of the Ural Mountains; Nikolai Nikitich (about 1774–1828), a zealous philanthropist, who introduced into his country several branches of industry, founded establishments of public utility and carried to a great state of perfection the working of mines. He had an annual income of more than $1,000,000. His last years he passed in France and Italy, enjoying the society of learned men and heaping benefits on all around him. He left two sons, Paul and Anatoli (1812–70), who, as well as inheriting his fortune, had also the same high taste and benevolence. The latter married Princess Mathilde, daughter of Jerome Bonaparte.

DEMIJOHN, a jug in a wickerwork casing or box, used for holding liquor.

DE MILLE, Henry Churchill, American playwright: b. North Carolina about 1853; d. Pompton, N. J., 10 Feb. 1893. He was graduated at Columbia College, and was by turns preacher and teacher till 1882, when he became examiner of plays at the Madison Square Theatre, and later for a short time an actor. His first successful play was the 'Main Line,' in which he collaborated with Charles Barnard. In 1887, having become associated with David Belasco, he wrote the society dramas 'The Wife' (1887); 'Lord Chumley' (1888); 'The Charity Ball' (1889); 'Men and Women' (1890). His last work was a melodrama adapted from the German, entitled 'Lost Paradise,' which was successfully produced in 1892.

DE MILLE, James, Canadian novelist: b Saint John, N. B., Aug. 1837; d. Halifax, N. S., 28 Jan. 1880. He was graduated at Brown College in 1854. He was professor of classics in Acadia College (1860–65), and of history and rhetoric in Dalhousie College, Halifax, from 1865 until his death. Among his publications are 'Andy O'Hara' (1860); 'The Soldier and the Spy' (1865); 'The Dodge Club' (1866); 'Cord and Creese' (1867); 'The American Baron' (1870); 'The Lady of the Ice' (1870); 'A Comedy of Terrors' (1872); 'The Living Link' (1874); 'A Castle in Spain' (1882–83); 'The Winged Lion' (1877; 2d ed., 1904), and many books for boys, including 'Treasures of the Sea.' A posthumous work, 'A Strange Manuscript Found in a Copper Cylinder,' appeared in 1888. A treatise of his on rhetoric was published in 1878.

DE MILLE, William Churchill, American playwright: b. Washington, N. C., 25 July 1878. He was graduated at Columbia University in 1900, and received his diploma from the American Academy of Dramatic Arts in 1901. His plays include 'Strongheart' (1905); 'The Warrens of Virginia' (1907); 'The Land of the Free' (1912); 'The Woman' (1912); 'The Royal Mounted' (1908); 'Classmates' (1907).

DEMING, Philander, American lawyer and author: b. Carlisle, N. Y., 6 Feb. 1839; d. 9 Feb. 1915. He was graduated at the University of Vermont 1861, and at the Albany Law School. From 1878–79 he was president of the New York State Law Stenographers' Association. He began to write stories for the magazines in 1873, and his published books include 'Adirondack Stories'; 'Tompkins and Other Folks.'

DEMING, county-seat of Luna County, New Mexico, 88 miles northwest of El Paso on the Southern Pacific, Silver City branch of Atchison, Topeka and Santa Fé and a branch of El Paso and Southwestern railroads. It is situated in a wide desert flat on bank of Mimbres River which is usually dry. Altitude 4,335 feet. For many years it was a small centre for widely scattered ranches and mining districts in Florida, Tres Hermanas and Victoria mountains and Cooks Range and had considerable cattle and wool business. It was incorporated 1901. The population was 1,864 in 1910, and about 3,500 in 1914, and has grown greatly since owing to great extension of irrigation, and the establishment of Camp Cody, for the concentration and training of soldiers for the war with Germany. A large amount of water underlies the desert in the Deming region which by pumping is raised for the irrigation of an extensive area yielding abundant crops of beans, tomatoes, alfalfa and other products.

DEMISE, dẹ-mīz′ (literally, a «laying down»), a grant by lease; it is applied to an estate either in fee-simple, or for a term of life or years. The word demise in a lease implies an absolute covenant on the part of the lessor for the lessee's peaceable enjoyment during the term. As applied to the Crown of England, demise signifies its transmission to the next heir on being laid down by the sovereign. «So tender is the law of supposing even a possibility of the sovereign's death, that his natural dissolution is called his demise, an expression which merely signifies a transfer of property» (Blackstone). The principle of immediate demise was laid down by William and Mary, in order to avoid the disturbances and inconveniences consequent to the death of the sovereign.

DEMIURGE, dĕm′ĭ-ẽrj (Greek, *demiourgos*, «a handicraftsman»), (1) designation applied by Plato and other philosophers to the Divine Being, considered as the Architect or Creator of the universe. The Gnostics made a distinction between the Demiurge and the Supreme Being; with them the first is the Jehovah of the Jews, who, though deserving to be honored as the Creator, was only the instrument of the Most High who created physical man. He was also called Archon and Son of Chaos, chief of the lowest order of spirits or eons of the Pleroma. Christ, according to the Gnostics, brought the revelation of the spiritual life which added to the «psyche» or sensuous soul, created by the Demiurge, the «pneuma» or divine rational soul. The origin of evil was sometimes attributed to the Demiurge.

(2) In some of the Peloponnesian states of ancient Greece the name Demiurge seems to have been given to a chief magistrate, probably corresponding to the Roman tribune. Among the Eleians and Mantineans they were the chief executive magistrates. In the Achæan league they ranked next to the strategi or generals. They were found also in the Dorian states.

DEMOCEDES, Greek physician: b. Crotona about 550 B.C.; d. 504 B.C. He was for a time physician to Polycrates, tyrant of Samos; was taken prisoner by the Persians and rose to a position of considerable influence at the court of Darius I through his medical skill. He persuaded the king to send him with others on a secret mission to Greece, but escaped from his companions and fled to Crotona. He is mentioned in Herodotus Bk. 3, pp. 129–138.

DEMOCRACY, History of. Introductory.— Some preliminary notion of what is meant by democracy will be indispensable at the outset in order to provide some logical basis for the organization of a discussion of its historical development. As a general concept it may be held that democracy is a form of *social organization* in which the participation of each individual in the various phases of group activities is free from such artificial restrictions as are not indispensable to the most efficient functioning of the group, and in which group policy is ultimately determined by the will of the whole society. The procedure adopted will be to trace the evolution of democracy in each succeeding period, as: (1) a practical fact in society; (2) a concept in social, political, and economic theory.

Democracy in Primitive Society.— Critical ethnologists have come into essential agreement that the earliest type of social organization among primitive men was that of the *local group* organized about the institutions of the family and the village, and characterized by the absence of any elaborate kinship organization. It is in these small social groupings that the nearest approach is found to the so-called «primitive democracy.» Here one finds small groups on a basis of intimate association, little affected by external influences, and the component individuals participate in the whole culture of the group to a degree unknown in modern society. As Professor Cooley has pointed out, these circumstances provide a psychological situation highly adapted to the development of intimacy and freedom in social relations. But, at the same time, as Professor Durkheim has vigorously insisted, these conditions are conducive to the maximum operation of those socio-psychological influences so familiar to the student of crowd psychology. Consequently, one finds in these primitive local groups a very considerable prevalence of customary regulations and restrictions, some tendencies toward the development of caste, and a particular susceptibility to the domination of the forceful personality — all of which seriously impair the operation of a democratic type of social organization and functioning. Also it must be recognized that these approximations to democracy in primitive society are rather incidents of an undeveloped pre-political condition than the result of conscious planning of social organization on the basis of political liberalism.

When one turns to examine what are generally the more advanced types of primitive society organized on a kinship basis, with either maternal or paternal descent, even less appears of the alleged democratic characteristics of primitive society. Every phase of life within the group is minutely ordered by a veritable maze of customary regulations which are enforced with great rigidity and severity. Within the group the freedom of the individual is further restricted by the general prevalence of social ranks and grades. The much vaunted tribal assemblies have been reduced by modern critical research from the «original fountain springs of political liberty,» as pictured by such writers as Maurer, Kemble and Freeman, to mere formal gatherings to grant a pre-assured acquiescence in the policies of the leaders of the group — a function strangely similar to that of the American party convention. A distinguished authority has remarked that the defiance of the policies of the chiefs by a tribal assembly is such a rarity as to constitute no less than a political revolution, something which is even less frequent in primitive than in modern society. Finally, an individual in primitive kinship society is not free to transfer his membership from one group to another, but must remain forever in his own group, as an individual in primitive society has no standing outside of his kinship group, and in such a case occupies the position of an outlaw. Viewed externally, then, primitive society is a «closed shop,» and internally it is dominated by a mass of customary regulations and is organized more or less according to a hierarchy of social classes. As primitive society approaches most closely the beginnings of real political or civil society the undemocratic features of social organization greatly increase.

It is scarcely necessary to point out the fact that aside from mythology there is no specific theorizing with respect to social and political relations in primitive society. In that period there is only one theory as to the foundations and justification of the existing social order, namely, that it is the only «safe» order. Its perpetuation unaltered and unimpaired is the only guarantee of relative immunity from the dangers lurking in the unknown. In primitive society, as among modern conservatives, there is a veritable sanctity in the existing order which precludes the possibility of any critical examination of its origin and justification.

Democracy in Early Political Society.— If any position of historical sociology can be regarded as established it is that political society and the state originated through the amalgamation of tribal groups as a result of the incessant wars waged in what Bagehot has called the «nation-making age.» In the highly autocratic and hierarchical caste society which then developed and which characterized early political society there was, of course, not the slightest approximation to anything democratic in any field of social relations. In no other stage has the individual counted for so little and been so circumscribed in his liberty as in the period of the formation of states and the development of early despotisms. The facts almost justify Hegel's famous dogma that in this period only the despot was free.

Early political society is characterized by as complete an absence of democracy in theory as in practice. The only expenditure of political thought was in justifying the existing régime on the basis of the sanctions of a unique revealed religion or the superior wisdom of ancestors. Existing institutions were held to be a part of the divine order as in primitive society they had been regarded as the source of the «luck» of the social group.

Democracy During Classical Times.— It is impossible to make any sweeping statement as to the degree of democracy realized in ancient Greece as the situation varied greatly in different periods in both Athens and Sparta. The radical transformations of Greek governments from tyranny to aristocracy and from aristocracy to the so-called democracy were so frequent as to give rise to the famous Platonic and Aristotelian theory of the cycles of governmental changes. True democracy was not prominent in Hellenic society. Even Athens, the most liberally inclined of the Greek city-states, at the period of its most democratic organization could scarcely be regarded as a democracy in the modern application of the term. While, as Mr. Zimmern has pointed out, there has been a tendency to exaggerate the number of slaves in Athens, there can be no doubt that there was never a time in Athenian history when a majority of the population was not excluded from participation in the life of the state. Greek «democracy» meant relative social and political equality only among the citizen class — the class, which in the opinion of Aristotle, was «born to rule.» Within this privileged citizen class, however, Athenian democracy made the closest approximation in antiquity to a democratic control of group activities.

In republican Rome the same conception of exclusiveness in the citizenship existed as had prevailed in Greece. The large numbers of slaves and foreigners were excluded from the political life of the state and within the citizen body itself there was less of a democratic control of political activities than had existed in Athens. Despite the gains made by the plebeians in the 4th century B.C. and the later attempts of the Gracchi to break down the domination of the aristocratic governing clique, the government of Rome drifted steadily into the exclusive control of the autocratic «ordo senatorius» and from that into the principate and the empire. The sodalities or industrial associations were the only approximation to social democracy, and they were discouraged and prohibited by the government. During the imperial period a slight movement toward democracy might be detected in the reduction of the number of slaves through manumission and the extinction of many of the sources of supply, but this slight symptom was more than offset by the growth of imperial despotism, the increase of plutocracy and the extinction of the curiate or middle class through the disproportionate burdens of taxation imposed upon it. As a result the middle class, the lower class freemen and the slaves were all assimilated into one semi-free class — the so-called «colonate.» Classical antiquity, then, never brought real democracy in the political, social or economic realms. It passed, leaving a more decided condition of inequality than it had received from the primitive tribal society with which it had started.

With the Greeks systematic speculation regarding the foundations of society and politics first appears. In the ‹Republic› and the ‹Statesman› Plato discussed the nature of democracy. He defined it as the rule of the many and held that it inevitably tended to degenerate into anarchy. Plato's «rule of the many,» of course, meant only the rule of the citizen minority of the population. Even this shadowy democracy did not attract Plato who preferred an enlightened monarchy. Aristotle devoted a portion of his ‹Politics› to a discussion and definition of democracy. From the standpoint of the terminology of political science he maintained that democracy was that form of government in which the majority of the citizens, excluding foreigners and slaves, directed the activities of the state for the advancement of their own class interests. It was, then, the corrupt form of «popular» government, the term «polity» being reserved for the virtuous administration of government by the whole body of the citizens. From an economic standpoint Aristotle held that democracy meant the control of public policy by the mass of the poor citizens who possessed little or no property. Aristotle was no more favorable than Plato to the exclusive «democracy» of the Greeks and held that the only valuable function of the people lay in electing and «scrutinizing» the officials, and not in the direct and actual control and operation of the government. Finally, Aristotle was as distinctly opposed to the full application of the democratic principle in society as in the state. He laid down his famous dictum that merit should determine social and political position and held that certain individuals on account of their inferior intelligence were born to serve the more intelligent and capable members of society. It is scarcely necessary to add that by the «intelligent and capable,» Aristotle meant the Attic Greeks, and by those fitted for perpetual servitude, the «barbarians.» Thus, his seemingly useful conception of social differentiation on the basis of ability resolves itself upon closer examination into a chauvinistic apology for racial egoism. While Plato and Aristotle had looked with disfavor upon even the limited democracy of Greece, Polybius held that in any stable state some permanent concessions must be made to the democratic principle. Drawing upon the experiences of the early Roman republic he put forth his famous theory of «checks and balances» which were to be brought about by including in the organization of the government the monarchical element, the aristocratic senate and the democratic assemblies. Only through this arrangement could one hope to prevent the continual changes in government which had been outlined in the famous classical theory of the cycle of governmental transformations. Finally, one finds among the Greeks the first adumbration of the doctrine of a governmental contract as the origin of political society — a theory first stated by the Sophists, Plato and the Epicureans and which was destined in the 17th and 18th centuries to work strongly for the development of democratic tendencies in politics.

Among the Romans the only significant development in political theory making for democracy was the doctrine of the Roman lawyers concerning the origin and justification of the political order. The lawyers held that the foundations of political authority lay in the consent of the people. Though the emperor might in fact be chosen by his legions in a remote boundary district the legal theory always held that he owed his authority to the tacit assent of the whole body of the Roman citizens. This theory fitted in well with, and advanced the doctrine of, the origin of political authority in a governmental compact.

Democracy in the Middle Ages.— The Roman Empire ended with the growth of plutocracy and the crushing out of practically all of the few democratic tendencies which existed. With the barbarian invasions and the establishment of the Teutonic kingdoms the fruits of classical civilization were for the most part lost and western Europe dropped back in a cultural sense into the conditions from which classical civilization had developed a thousand years earlier. Even the feeble advances which classical civilization had made in the direction of democracy had to be regained before further progress could be made toward the securing of personal freedom, political enfranchisement and popular control of public policy.

Feudal society, developing from roots in the Roman *villa* and in the German *mark* and *comitatus*, offered little opportunity for the development of democracy. With its perpetuation to a slight degree of the slavery of classical times and its retention on an extensive scale of the serfdom or half-free condition found in the colonate of the later Roman Empire, the feudal age was in general even less democratic in a political sense than the classical city-states. On the manors there were some democratic tendencies in the intimate communal life of the serfs, and Professor Giddings has insisted that the real origin of modern social democracy is to be looked for in the enforced equality among the members of this servile class in the Middle Ages. Some symptoms of democracy also appeared in the mediæval free towns, but they were not extensive. The political, social and economic organization was hierarchical and restrictive, and equality in the mediæval town, as in the classical city-state, meant the equality of the favored few. The Magna Charta as a harbinger of modern democracy has withered before modern historical research quite as much as the Teutonic folk-moot. It did not mark a movement looking toward modern political liberalism, but was a reactionary manifesto of the feudal lords who were irritated by the recent extension of royal power and in 1215 made an effort to pull England back into the decentralized lawlessness and local tyranny of the feudal period. The only notable development of democracy in the Middle Ages occurred as an incident of the rise of Christianity. A number of writers have claimed with some degree of justification that the first instances of real democratic society are to be found in the early Christian communities of the Apostolic Age. Certainly, the only extensive development of democracy in social organization in the mediæval period occurred in the monastic movement, and in the monasteries essential equality was the general rule. The organization of the secular clergy in the mediæval Church, however, with its elaborate hierarchies for ecclesiastical administration and for the control of the sacraments, was scarcely less autocratic than the feudal society of the period. The only concession that the mediæval Church made to democracy was that its offices were in theory, at least, open to all classes solely on the basis of merit. On the whole, however, democracy or any strong prophecy of democracy scarcely appeared during the thousand years that followed the collapse of the western Roman Empire.

The advances made toward the development of the theoretical concept of democracy during the mediæval period were as scanty as the achievements in the field of democratic practices. The Christian conception of the «brotherhood of man» was certainly more democratic in its implications than the early Stoic doctrine. The Stoics had meant by this phrase merely the brotherhood of the intellectually élite, but the Christians rejected this limitation and emphasized the reality of universal human brotherhood through the medium of faith and belief. In the field of political theory there were few developments beyond a revival of various doctrines which had appeared in classical antiquity. Manegold of Lautenbach, in the last half of the 11th century, gave the first explicit statement to the mediæval version of a governmental compact as the basis of political society and held that the breaking of this contract by the prince was sufficient to justify rebellion among his subjects. In the same century the revival of Roman law familiarized western Europe with the lawyers' doctrine of popular sovereignty, a conception later developed with great vigor by Marsiglio of Padua. The Conciliar movement of the 15th century, based largely upon the Roman legal theory of the corporation, attempted to work out a theory of representation for ecclesiastical government. While the insistence of the great theorists of the Conciliar movement, such as Gerson and Cusanus, upon the validity of the doctrine of popular sovereignty was an important development in the direction of democratic political theory, the Conciliar doctrine of representative government was rather one which looked back to the system of feudal estates than forward to the modern parliament. Those who look to the Conciliar movement for the origins of modern representative democracy are not less in error than those who try to derive it from the Magna Charta. The concept of democracy scarcely figured in any mediæval discussion save in the writings of those mediæval scholastic philosophers who revived the Aristotelian terminology and analysis with its contempt for democracy. The concept of the «people,» which appeared so frequently in the latter part of the mediæval period, in the discussions of popular sovereignty was scarcely a democratic notion. By the «people» was meant only the first three estates, excluding the peasantry which constituted the vast majority of the population, and it did not usually refer to the people as individuals but as a corporate entity.

Democracy from the Commercial Revolution to the Industrial Revolution.— Beginning with the opening of the 16th century and extending over about two centuries there occurred that great transformation which marks the dawn of modern society — the «Commercial Revolution.» The explorations and discoveries and the resulting contact with new cultures broke through the «cake» of mediæval custom and opened the way for the development of modern institutions and ideas. The increased volume of wealth at the disposal of the monarch, as a result of the «intervention of capital,» enabled him to develop a paid officialdom and army and by their assistance to crush feudalism and perfect the national state. But the most important of all of its results was the great increase of the bourgeoisie, or middle class, which, as Professor Hayes has so well explained, was destined for centuries to be the centre from which all liberalizing and democratizing influences spread and which ultimately secured the well-nigh universal destruction of the autocratic and exclusive social and political régime which had characterized the Middle Ages. The Protestant Reformation made few contributions to democracy in politics. In fact, it made the lot of the peasantry harder than before, but it did increase the power of the upper middle class and thus accelerated the movement already begun by the commercial revolution.

In England during this period the new middle class effected the greatest transformation of the social and political order which was accomplished before the 19th century. By the beginning of the 17th century the power of the feudal nobility had generally vanished, serfdom had disappeared and the restrictive gild system of industrial organization had been practically eliminated. Before the close of the century, through successive concessions from the king and through the revolutions of 1649 and 1689, the bourgeoisie had dethroned two autocratic monarchs, had eliminated the rule of royal arbitrariness in politics and law, had brought about the predominance of Parliament in the government and had enacted into a constitutional document those guarantees which have since come to be recognized as the most fundamental of human rights. While oppressive religious disabilities, exclusive property qualifications for participation in political life and the perpetuation of many of the social phases of mediæval feudal aristocracy all operated to prevent England from being classed as a democratic nation in 1700, the fact that the middle class had created a constitutional system and had secured the complete domination of the Parliament — the popular branch of the government — constituted an epoch-making step toward the ultimate development of democracy.

In France, even more than in Tudor England, the commercial revolution at first made rather for the development of royal absolutism than for the growth of constitutional or democratic government. The Estates-General, summoned in 1614 for the last time in 175 years, made a pathetic failure as compared with the achievements of the English «Long Parliament» and the hope of a gradual evolution of legislative supremacy in France, such as had taken place in England, perished. The political power of the feudal nobility was crushed by Richelieu's centralizing policies and by the suppression of the «Fronde» in 1652, but they retained their oppressive social and economic privileges until the «August days» of 1789. The French Revolution of 1789 to 1795 was the product of the abuses of the «old régime,» of the revolutionary political theory of the English Whigs, of the intellectual impulse from the French «philosophes» and of the American example of a successful experiment with revolution and the beginnings of democracy. The «third estate» had been too weak in 1614 successfully to oppose the combined strength of the monarch and the first two estates, but their strength had so increased by 1789, as a result of the effects of the commercial revolution, that they were able to coerce the monarch, the weakened nobility and the clergy and they proceeded to clear away not only the vestiges of feudalism but also the oppression of the Church and the tyranny of the monarch. The calling of the Estates-General in 1789 is worthy of passing mention in any historical survey of the development of democracy because the first instance in history of the exercise of universal manhood suffrage occurred in the election of the deputies of the third estate. The most significant achievements of the French Revolution were the abolition of these economic and social aspects of feudalism which still persisted, the establishment of a constitutional monarchy in 1791 and of a republic in 1792. Though many of these reforms proved transitory, their effect was never entirely lost and they constituted the stimulus and precedent for the more gradual development of French democracy in the 19th century.

In all other important European states, with the exception of the abortive reforms of Joseph II of Austria, the old régime with all of its mediæval institutions and practices remained practically undisturbed until the 19th century. It was not until after the influence of the French Revolution was spread throughout Europe by Napoleon, and the «Industrial Revolution» had still further increased the numerical strength of the bourgeoisie, that this class was able to carry its liberalizing activities with some degree of success into central, southern and eastern Europe.

The establishment of an aristocratic republic in America in the closing years of the 18th century marked an important advance in the development of democracy. While American society and politics at the beginning of our national history abounded in undemocratic features, the new state had been founded on revolution from established authority; and it was one of the first examples in history of an extensive federal republic and of a government organized on the basis of a written constitution formulated by a national constituent convention. It, therefore, stimulated the growth of constitutionalism and republicanism elsewhere, most notably in France, and it laid the foundation for what became in the 19th century the most ambitious experiment which has yet been conducted in the democratic control of political institutions. In America, as in England and France, the revolutionary movement was organized by the middle class made up of merchants and the professional classes.

In the period between 1500 and 1800 many notable advances were made toward the development of democratic tendencies in political theory. The most significant and influential of these was the doctrine of a social contract as the explanation of the origin and justification of social institutions and political organization. This doctrine, as distinguished from the earlier theory of a governmental contract, was first enunciated by Æneas Sylvius in the middle of the 15th century, but it did not become an important dogma in political theory until it was expressed by the English churchman, Hooker, and the German jurist, Althusius, at the opening of the 17th century. It received a systematic exposition in a number of classical works, particularly those of Hobbes, Pufendorf, Spinoza, Sydney, Locke, Rousseau, Kant and Fichte. It was not necessarily a democratic doctrine and it was used by some of its adherents, most notably by Hobbes, to defend royal absolutism. In the hands of Locke and his plagiarist, Rousseau, however, it worked strongly for the destruction of the obscurantic and autocratic divine right theory and provided a theoretical justification for altering the existing political order when it had become subversive of the terms of the original contract. In other words, it provided a doctrinal foundation for political revolutions and it was used to inspire and justify the great revolutions of the 17th and 18th centuries in England, France and America. This revolutionary version of the social contract theory powerfully stimulated the development of the doctrine of popular sovereignty. Another important contribution was the doctrine that «life, liberty and property» are the natural and inherent rights of all men. This theory, first stated by Fortescue at the close of the 15th century, was again enunciated by the Levellers in the middle of the 17th century and was given a permanent position in political theory through the influence of John Locke. It was widely at variance with the contemporary social and economic oppression and arbitrary government and it was highly influential in combatting these conditions, especially when these «rights» became a part of the program of the radical party in the various countries. In addition to their early formulation of the doctrine of natural rights, the Levellers made another significant contribution to the general body of democratic political theory, namely, the doctrine that every citizen should be accorded the right of participating in political activity through the exercise of the suffrage. Another important doctrine making for democracy in politics was that which was most vigorously expounded by Locke, namely, the legal supremacy of the legislative or popular branch of the government. The importance of this doctrine appears when one reflects that without the predominant power of the elective or popular branch of the government which makes it possible for the representatives of the people to control the policies of the state, the fact that the people have the right of universal suffrage and the election of representatives does not ensure a democratic control of public policy. The impotence of the German Reichstag and the autocratic nature of the German imperial government, in spite of universal suffrage, is the most striking modern demonstration of the fact that without a powerful legislature all the other incidents of democracy may be vain and empty forms. Finally, the Utopian socialistic schemes of such writers as More, Bacon, Campanella and the pre-revolutionary socialists in France made provision for the introduction of some degree of social democracy. It is most significant, however, that during this entire period there was no systematic analysis of the meaning and implications of democracy, nor, with the doubtful exception of Mably in France, Tom Paine in England and Jefferson in America, was there any important defense of democracy as the ideal form of government. Most of the radicals regarded a constitutional monarchy or, at the most, an aristocratic republic as the ideal form of government. Montesquieu and Rousseau, for example, both held that a democracy would only be tolerable in a very small state and could never be successful in an extensive country. In short, all of the theories of the period which have been briefly summarized above were rather fragmentary contributions which might later be utilized in a systematic analysis and defense of democracy than anything which could be regarded as comprehensive and thorough-going discussions of the nature and validity of democracy itself.

Democracy from the Industrial Revolution to the Present Day.—At the opening of the 19th century democracy did not prevail in any country in the world, and only England, France and the United States had made any notable progress in that direction. Even these modest advances seemed destined to be crushed and the old order restored after 1815 through the sinister influence of Metternich, the able and alert statesman of the old régime, who had extended his reactionary system throughout continental Europe by 1823. But in that year he received his initial reverse in Great Britain's challenge to the intervention of the reactionaries in the South American revolutions. This action of Great Britain was not so much motivated by an abstract love of liberty and revolution, for these were scarcely more pleasing to her Tory ministry than to Metternich, but was rather led to this course by the fact that her trading interests, so greatly increased by the industrial revolution, were more likely to be advanced by the freedom of the Spanish-American republics than through the return of Spanish control. The industrial revolution thus gave the old régime its first serious rebuff and from that time on it has caused it continually to retreat until to-day it retains only a precarious hold on those mid-European states where Metternich had most thoroughly established his system. This greatest transformation of all phases of life in the history of mankind, which has been known since Arnold Toynbee's time as the “Industrial Revolution,” came first in England between 1750 and 1825 and was passed along to the Continent, reaching France between 1825 and 1840, Germany from 1840 onward, but especially after 1870, Austria about the same time, and scarcely touching Russia until the last decade of the 19th century. In addition to its great series of mechanical inventions, it tremendously accelerated the process begun by the commercial revolution, namely, the increase of the bourgeoisie or middle class, to which the world owes most of the great advances in civilization and liberalism. This class, motivated in part by sentiments of enlightened humanity and in part by selfish class interests, carried the day against the autocracy of the old régime and made it possible for the proletariat, which was also created by the industrial revolution, to consolidate the positions already won for it by the bourgeoisie and to begin the struggle for the final realization of democracy in the true sense of the word. The battle for political and social democracy, then, in the last century has centred about three successive tasks: (1) the elimination of the vestiges of the old régime — the heritage of the Middle Ages; (2) the establishment of the liberal régime of the “benevolent bourgeoisie”; and (3) the attack upon the supremacy of the bourgeoisie by the proletariat, beginning about the middle of the 19th century. All of these forces were created or set in motion by the industrial revolution and attention may be turned to the manner in which they have been realized in the leading countries of the Western world. Most of the achievements in these directions have consisted in the extension of the suffrage, the increase in the importance of the popular or legislative branch of the government as compared with the executive, the extension of representative institutions, a broadening of the conception of the scope and functions of government, and the drafting of written constitutions which acknowledge and guarantee these progressive achievements. As important as political and social democracy is economic democracy, or the equal right of all classes to such action as is necessary to advance and safeguard their material interests. At the beginning of the 19th century economic democracy was as far from realization as political democracy and the advances made since that time have been most notable. In 1800 most of the extensive restrictive economic regulations which had been enacted during the two previous centuries operated in favor of the vested interests of the squirearchy. With the growth of the political power of the bourgeoisie after the industrial revolution went the abolition of most of the old restrictions on economic activities and there was instituted the reign of *laissez-faire* which gave the middle class manufacturers and merchants unrestricted opportunity for the development of their great industrial enterprises and for the enjoyment of the “blessings” of the freedom of contract. This individualistic movement was most thorough-going in England, where it was chiefly associated with the work of Cobden, Bright, Mill and Gladstone, but no European country entirely escaped its influence. *Laissez-faire,* however, gave economic liberty only to the upper middle classes and it is to the development of trade-unionism that one must look for the movement which has been, up to the present time, the mose effective instrument for advancing economic democracy among the laboring classes.

In England the middle class secured their first great triumph over the old order in the Parliamentary Reform Bill of 1832 and in the Municipal Reform Act of 1835. These reforms destroyed the mediæval system of election and representation which had persisted in England until that time and gave political recognition to the dislocation of economic interests and population caused by the industrial revolution. They were scarcely a direct victory for democracy, as they did not carry with them an enfranchisement of the masses, but they did constitute an indirect triumph in that they brought into power the bourgeoisie who immediately proceeded to clear away many of the most formidable obstacles to the ultimate realization of democracy. The democratic movement of this period — Chartism — proved a pathetic failure, but essentially all of the Chartist demands have since been realized, a significant testimony to the progress of democracy in England. The first important direct step in the actual realization of political democracy in England came in Disraeli's Borough Franchise Bill of 1867 which brought something approaching universal manhood suffrage to the residents of boroughs. A similar extension of the franchise to the working classes in the country by Gladstone's bill of 1884, for all practical purposes, made in England a political democracy. The process has been carried to completion by the sweeping Franchise Act of February 1918 which brought universal suffrage to males and introduced on a very liberal scale the principle of woman suffrage, thus making England's electorate the most inclusive and democratic of that of any modern nation. Fortunately, England, two centuries before, had established the supremacy of Parliament and when the people secured the vote they were able to use it to influence the policies of the government and secure for themselves the substance as well as the form of political and social democracy. The grip of the people upon the legislative power in Great Britain was made more extensive and more certain by the Parliament Bill of 1911 which finally assured the supremacy of the House of Commons. Beginning with the Elementary Education Act of 1870, the people have been able in part to transform England into a social as well as a political democracy. Especially rapid has been the progress in this direction under the Liberal domination since 1905, as is abundantly testified by the remarkable series of reform measures passed since that time. Among the most conspicuous of these have been the Workmen's Compensation Act of 1906, the Education Act of 1906, the Small Holdings Act of 1907, the Old Age Pensions Act of 1908, the Labor acts of 1909 and 1913, the Lloyd George Budget of 1909–10, the National Insurance Act of 1912 and the Franchise and Education Acts of 1918. These are a convincing demonstration of the fact that the English proletariat has now gained for itself the position held in 1815 by the Tory squirearchy and in 1848 by the bourgeoisie liberals. Economic democracy in England has been realized through the abolition of the various restrictions upon the freedom of economic activity which existed in 1800. This was accomplished through the efforts of the middle class and the proletariat. Especially significant has been the development of trade-unionism. This was first legalized through the activities of Francis Place and Joseph Hume in 1824–25. It has received further legislative encouragement by the laws of 1871–76, 1906 and 1913, and, in spite of some recent adverse court decisions, the right of trade unions to organize and act seems firmly established in England. In spite of a titular monarch and aristocracy, England is at the present day, perhaps, the most democratic of the great modern nations.

In France the ultra-conservative squirearchy, led by the arch-reactionary Charles X, made a most daring and determined effort, between 1815 and 1830, to restore the old régime. The futility of the attempt to revive in France the order of things which had existed before 1789 was demonstrated by the Revolution of 1830 which sent into final oblivion the autocracy and corruption of Bourbon absolutism. The bourgeoisie liberals, strengthened by the effects of the industrial revolution, came into power with the Orleanist monarchy of 1830 to 1848. Louis Philippe, however, refused to square his policies with the growth of liberalism and met, in 1848, the fate which Charles X had encountered in 1830. The new Republican government developed a fatal split over its policies and the Bonapartist adventurer, by the aid of this division among Republicans and Socialists and the romantic lustre of his name, was able to establish a temporary autocracy. But during its brief period of power the Provisional Government of 1848 secured for France the enactment of a universal male suffrage law, which has been retained almost entirely unchanged down to the present day. This gave France the double honor of being the nation which originated the practice of universal manhood suffrage in 1789 and also the first powerful nation to adopt as a permanent political institution the practice of universal manhood suffrage. Like his predecessors, Charles X and Louis Philippe, Louis Napoleon was unable to resist the growing forces of democracy and liberalism which were being continually augmented by the effects of the industrial revolution and the growth of the bourgeoisie, and even before he was swept off the throne by the debâcle of 1870 he had been compelled to relinquish most of the attributes of autocracy and to establish a liberal constitutional monarchy. The attempts to return to monarchy between 1871 and 1879 failed utterly, and with the accession of President Grévy in 1879 it was definitely established that the constitution of 1875 would be interpreted to mean that France was to be henceforth a Parliamentary Republic. Gathering impetus in the decade of the eighties, through the vigorous leadership of Jules Ferry, the Republic gained sufficient strength to be able to withstand the onslaughts of monarchists and clericals in the Boulanger episode and the Dreyfus affair and emerged from the latter stronger than ever. Under the Third Republic the French proletariat has increased in political power until the progressive democratic element is to-day as firmly entrenched in its control of political policies as the bourgeoisie were in 1840. Their power has been given objective expression in a series of social reform acts which rival England's achievement in this field. In France, economic democracy was advanced by the law of 1864, giving workingmen the right to combine for strikes, and by that of 1884, granting general freedom of organization to the working-class. The attempt of the government employees, however, to establish their right to strike in 1909 and 1910 failed almost completely. In France, as in England, democracy is to-day a realized fact.

Vastly different than the record of England and France has been the course of events in central Europe in the 19th and 20th centuries. Stein and Hardenberg had abolished serfdom in Prussia in 1808–11, but in 1815 Metternich was able to preserve the old régime intact in Austria and was also able to nullify the decree of the Congress of Vienna which ordered each ruler in the German Confederation to give his state a constitution. Between 1815 and 1848 the power of the middle class was increased by the first effects of the industrial revolution and a disgruntled proletariat was also created. A liberal and democratic régime would probably have come into existence in central Europe in 1848 had it not been for the fact that the problems and issues of nationality and dynasty conflicted with the cause of liberalism and democracy. Taking advantage of this division of strength and interests among the liberals, the reactionaries, led by Schwartzenberg, were enabled to triumph in 1848–50 as they had in 1815. The tragic significance of this failure of the liberal movement in mid-Europe in 1848 can scarcely be exaggerated. In Germany it meant that German unity was not to be accomplished under the benevolent auspices of the liberals of the Frankfort Parliament, but under the autocratic and brutal "blood and iron" policy of Bismarck, who, after creating the German Empire in this manner was able to throttle all subsequent attempts to liberalize it and bring it up to the level of modern democratic nations. Taking over bodily the mechanical aspects of the industrial revolution from England, Germany presents, as Professor Veblen has so convincingly pointed out, the curious spectacle of a great modern industrial and commercial nation dominated by political autocracy and a mediæval intellectual atmosphere. The semi-mediæval constitution given to Prussia in January 1850 by Frederick William IV has been retained practically unchanged and no redistribution of seats in the Prussian Landtag has taken place since 1860, thus giving rise to a situation resembling that of the notorious "rotten boroughs" of England before 1832. Furthermore, the exclusive three-class system of distributing the suffrage and the archaic method of oral voting in Prussia destroy even those slight traces of democracy which might exist in spite of discouraging surroundings. In the German Empire universal manhood suffrage was introduced in 1871 for elections to the Reichstag, but as the Reichstag is only an impotent debating society dominated by the autocratic Bundesrat and the still more mediæval Prussia, the representatives of the people cannot make their will effective in the government and the vaunted universal suffrage and the alleged democratic Reichstag appear upon close examination to be merely empty shams, the verbal eulogies of Prussian apologists notwithstanding. To make matters still worse, the distribution of electoral districts for seats in the Reichstag has not been altered since 1870. This excludes the great industrial cities of modern Germany from anything like an equitable representation, deprives the bourgeoisie and proletariat of a just expression of their will, even in the forensic department of the German political organization, and perpetuates the dominating influence of the reactionary squirearchy. Moreover, since 1907 that most fundamental of all contradictions of democracy, the subordination of the civil government to the military, has, for all practical purposes, existed in the German Empire. From the standpoint of the realization of political democracy, then, Germany's condition to-day is very similar to that of England in the time of Henry VIII and of France in the days of Charles X. Nor is there any greater degree of social democracy in Germany. The elaborate social legislation program of Bismarck came not from the influence of the people nor as a result of the modern democratic conception of the state as the agent and servant of the people, but proceeded from Bismarck's highly undemocratic desire to crush the Social Democrats, to ensure a healthy nation as the indispensable basis of a strong military system, and to attach the people to the autocratic German state through gratitude for its paternalism. The social legislation of modern Germany is, thus, in no way a symptom of social democracy, but is simply the outgrowth of the same 18th century enlightened despotism that impelled Frederick the Great to undertake his internal reforms in Prussia. Of the truth of this assertion overwhelming proof is afforded by the fact that the Social Democrats invariably opposed the social legislation of Bismarck, and by Bismarck's acknowledged purposes in undertaking the program of social reform. In Germany, trade unionism, as a movement toward economic democracy, made its first appearance as a significant movement in the decade of the sixties, but was greatly weakened and suppressed during the period of anti-socialistic legislation between 1878 and 1890. After 1890 it revived and has received legal sanction for extensive economic activities. It is probable that no fact in recent history so clearly indicates the power of the underlying forces now making for democracy as the action of the German governing classes in 1914. In spite of their throttling control over the organs of government, they were unable to check the operation of those great industrial and social forces which have created modern democracy and they deemed it necessary to stake their very existence in the desperate attempt to stifle the growth of liberalism by the consolidation of all classes and the submergence of all opposition through the psychological effect of the great national and patriotic enterprise of an aggressive, vigorous and glorious European War.

In the Austrian Empire political liberalism, since its defeat in 1850, has met a somewhat kinder fate than in the Prussianized German Empire. No serious attempt was made to restore the feudal system which was abolished in 1848–49, and in the period from 1860 to 1867 the liberally inclined Francis Joseph, in order to placate his own subjects and the Hungarians for their disappointments in 1848–49, granted reforms which embodied many of the aspirations of the liberals of 1848. An important approximation to real parliamentary government was secured by the Constitution of 1861 and the "fundamental laws" of 1867 which gave the Austrian legislature a legal position of much greater power than that possessed by the German imperial legislature, carrying with it the institution of ministerial responsibility. While the suffrage was at first extremely exclusive, the acts of 1896 and 1907 have introduced universal manhood suffrage. The existence of a considerable degree of social democracy in Austria is also attested to by the passage of a number of important social reform acts since 1885 which have not been simply a perpetuation of the benevolent despotism of Joseph II, but have been largely a result of the agitation of Socialists and Liberals. Economic democracy has appeared in Austria as a result of the legalization of trade-unionism in 1869 and its subsequent growth since that time. While many influential vestiges of autocracy still remain in Austria in theory and law, and many more in actual fact, there can be no doubt that Austria has advanced much further along the "democratic path" than her great mid-European ally.

Hungary, however, has been little affected by the progress of either political or social democracy in the other member of the Dual-Monarchy. It has made almost no advances in a liberal direction beyond the situation which existed in 1847 except to retain the act of the liberals of 1848 abolishing the political and economic aspects of feudalism. Hungary remains to the present day politically and socially the most illiberal, archaic and mediæval of any great European nation.

In Italy the permanent establishment of parliamentary government was anticipated by Charles Albert of Piedmont in 1847–48 and was assured by the efforts of Cavour, a great admirer of the English system and one of the most vigorous advocates of parliamentary institutions among the liberal statesmen of the 19th century. The necessary complement of parliamentary government, universal suffrage, was secured by the laws of 1882 and 1912. Finally, social democracy has made great strides in the laws of 1886, 1898, 1908 and 1912 which protected the labor of women and children, insured the working classes against accident, sickness and old age and established a national life insurance system. In Italy trade-unionism has had a very recent origin and development. Coming into existence along with the growth of the strength of radical parties recruited from the proletariat, trade-unionism has been little hampered in Italy by restrictive legislation.

In Russia, which retained most aspects of the mediæval system unimpaired, with the exception of the transitory reforms of Alexander I, down to the middle of the 19th century, an epoch-making step was taken in the formal abolition of serfdom by the decree of Alexander II on 3 March 1861. The adjustment of the conditions of emancipation, however, brought little progress in the direction of social democracy, but resulted essentially in a transformation of the peasantry from serfs of nobles to «serfs of the state.» Not until the manifesto of 16 Nov. 1905, the edicts of November 1906 and the sweeping land reforms of 27 July 1910 and 11 June 1911, were the intended benefits of the Emancipation Act of 1861 and the real abolition of serfdom actually accomplished. The first important movement in the direction of political democracy in modern Russia came in 1864, when Alexander II issued his notable decree creating the local assemblies or *zemstvos*, thereby introducing some degree of local self-government into Russia, something which had not existed since the period of centralization under Peter the Great at the opening of the 18th century. After the Polish revolt of 1863 Alexander II, like his uncle, Alexander I, abandoned his early reforming tendencies and the night of reaction settled upon Russia which was not to be broken for 40 years, in spite of the policy of revolutionary terrorism and the assassination of tsars, dukes and public officials. But the grip of reaction, which assassinations could not break, was weakened by that deadly and persistent enemy of mediævalism in politics and society — the industrial revolution — which first began to affect Russia on a considerable scale in the nineties during the ministership of Witte. This greatly strengthened the hitherto insignificant Russian middle class, in which lay the only hope of liberalism. Guided by such able leaders as Professor Milyukov and aided by the discrediting of the old régime through the disasters of the Russo-Japanese War, the bourgeoisie, in the revolutionary movement of 1905–06, were able to extort from the tsar the grant of approximate universal suffrage and the creation of a constitutional parliamentary government. When freed from the strain of war, however, the tsar, encouraged by his reactionary ministers, proceeded to abrogate his liberal measures by limiting the powers of the Duma and by altering the electoral law so as to defeat the principle of universal suffrage. While this reactionary policy proved temporarily successful, in 1917, disasters more serious than those of 1904–05 drove the discredited autocracy from Russia in complete humiliation. During the summer of 1917 the Russian revolution passed through those stages, so familiar to students of French history between 1789 and 1793, from the control of constructive bourgeoisie statesmen to that of the leaders of the Bolsheviki mob. The ultimate outcome of the revolution cannot be predicted, but it is probable that it will be as impossible to re-establish the conditions of 1900 in Russia, as it was in France to bring about a return to the order of things which existed in 1788.

In the United States democracy was nearer to realization in 1800 than in most European countries, and, consequently, the advances made since that time have been more gradual and less spectacular than those in Europe. In the first half of the century the main «achievements» in «democratizing» the nation consisted in the abolition of the aristocratic property qualifications for the exercise of the suffrage and in the vulgarization of the concept and practices of democracy, as a result of the Jacksonian system. To men like Jefferson democracy had a strong Aristotelian flavor and great emphasis was laid upon special training, high intelligence and expert direction of government. With the advent of the Jacksonians all this was changed. The «dangers» of special preparation for office were emphasized, supreme faith was put in «pure» democracy, and rotation in office and the «spoils» system were made the indispensable guides for administrative procedure. It was not strange, then, that the rule of statesmen ceased in the United States and the era of politicians, so inseparably connected with the democracy of America, began. The scandals of the «spoils system» were in some degree curbed by the movement for civil service reform which began in the administrations of Grant, Hayes and Arthur. This salutary tendency was courageously supported by Cleveland, particularly in his second term, and though it was weakened somewhat by McKinley, it was revived with renewed vigor by Roosevelt and Taft. Even firmer and more extensive is the hold of the spoils system on American State and local government. Democracy in America has, thus, failed to produce that efficiency in the public service which has been realized in autocratic Germany or in democratic England and France. The most pressing problem in American politics is to work out a plan for the introduction into the democracy, already won, of the principle of special fitness for public service. The great obstacle to social democracy in America — negro slavery — was removed in part in 1863, but this question has been one in which democracy has been complicated with the much more difficult problems of race prejudice, and its final solution is not likely to be arrived at for a century. In many ways the show of strength of the Progressive party and the victory of the Democratic party in 1912 may be regarded as a gain for social democracy as they were symptoms of a great popular protest against the domination of American politics and legislation by the conservative wing of the capitalistic class, which had become entrenched in American politics as never before, after the retirement of President Roosevelt. Economic democracy seems legally if not actually achieved in America. The use of «blanket injunctions» against trade unions, so common in the labor disputes of the nineties, has declined greatly, and the attempt of the conservative capitalists between 1908 and 1912 to bring the trade unions within the reach of the anti-combination acts was at last defeated by the Clayton bill. Finally, it must be noted that «democracy in America» is no longer restricted, as it was in the time of De Tocqueville, to the United States alone, but has become an assured fact in the Dominion of Canada and has made notable advances in some of the leading countries of Latin America.

Nor is the United States, as it was in De Tocqueville's day, the most advanced and extensive laboratory in the democratic experiment. That position has passed to the Australasian possessions of Great Britain. Building on the precedent of the United States, Australia and New Zealand have passed far beyond their model in the originality and extent of their experiments in social, economic and political democracy. With their universal male, and practically universal female suffrage, their parliamentary government, their elaborate series of social reform measures, and their original experiments in attempting to solve the perplexing problems of economic democracy they are easily entitled to the front rank in the vanguard of the world's progress toward ultimate democracy.

These notable achievements, which have been all too briefly enumerated above, have constituted great strides in the direction of political democracy since 1800, but they have left many grave problems still unsolved which will have to be met and conquered before democracy can be regarded as finally achieved. The securing of universal suffrage and representative government has made political democracy possible, rather than assured its existence. As Mr. Bryce and Mr. Michels have so well pointed out, the political boss has proved quite as much of an obstacle to modern democracy as did the feudal lord to democratic tendencies in the mediæval period. Attempts have been made, which are as yet only partially successful, to eliminate his sinister influence through such devices as the direct primary and the civil service laws. Also archaic forms of political institutions have often been found unsuited for a rapid and flexible adjustment to the desires and needs of the people and such machinery as the initiative, referendum and recall has been introduced in the hope of making government more sensitive and responsive to the public will. Again, many of the problems connected with the perfection of representative institutions are yet to be solved, and to meet this need schemes are being proposed and adopted which embrace the principle of minority and proportional representation and the representation of professional and economic groups. Then Mr. Hobhouse and others, from the standpoint of political theory, and President Wilson, from the position of the constructive statesman, have reminded the world that most difficult and perperplexing problems are involved in reconciling political democracy at home with the repression of subject peoples in imperial dominions. Finally, no one can seriously maintain that social and economic democracy are yet fully achieved when such extremes of social and economic position exist as are revealed, not in the morbid harangue of the soap-box orator, but in the sober and reliable statistics gathered by every great modern nation. While it is neither probable nor desirable that society will permanently adopt any method of graduating social and economic reward other than that of services rendered, it is a patent fact that the prevailing methods of determining the value of services is sadly antiquated and in need of revision, particularly in the direction of preventing rewards from being inherited instead of earned. It is further necessary to take such steps as shall be required to ensure that all members of society may receive approximate equality of opportunity and equipment for rendering services to society and receiving their reward therefor.

There can be no doubt that the present World War will have a far-reaching effect upon the future of democracy, not only in its reaction on the domestic policies of the various States involved, but also in the readjustment of nationality and imperialism in a manner more in accordance with the principles of self-determination and democracy. While there are powerful classes, organizations and individuals in every country opposed to Germany, who are really much more in sympathy with the German system, principles and practices than with true democracy in politics, society and industry, it is certain that as the gigantic conflict has progressed it has assumed more and more the nature and characteristics of a final struggle between arrogant nationalism and mediæval autocracy, on the one hand, and modern democracy and the rule of international law on the other. A profound change in the political and social order, comparable only to that which took place from 1789 to 1815, must be the inevitable outcome.

The development of the importance of democracy as a problem for theoretical analysis by the various branches of social science since 1800 has been fully as remarkable as the phenomenal growth of democracy in social, political and economic life. As was pointed out above, democracy until this period was not of sufficient importance in political philosophy ever to have received a comprehensive and systematic analysis by a political theorist. Since the beginning of the 19th century, however, works on various phases of democracy have appeared in such a volume that only a few leading tendencies can be noticed in the scanty space which remains.

In the first place, it is interesting and significant that the chief trends in the development of democracy in political theory closely parallel, and, to a large degree, were determined by the actual development of democracy in practice. Just as the first great advances toward democracy in the 19th century were the work of the middle class advocates of *laissez-faire,* so the first great expositions and defenses of democracy came from individualists in political theory such as Jefferson, Mill, Cobden and Spencer, who defended a semi-Aristotelian variety of democracy, in which the masses should participate but should be directed by the intellectually élite. Again, in the same way that democracy has in fact been made more inclusive to embrace the proletariat as well as the bourgeoisie and has tended to adopt a broad program of social reform and state activity, so to-day the chief advanced exponents of modern democracy are to be found among the Socialists and radicals — men like the great socialistic leaders Bebel, Liebknecht and Jaurès, such radicals as H. G. Wells, Bernard Shaw and others of the English Fabian group, and sociological reformers who advocate a policy of extensive state activity and a radical program of social reconstruction in behalf of the proletariat. The present day adherents of the mid-Victorian individualism of Mill have become the conservatives, who, in political theory, occupy to-day the position once held by Metternich and the Duke of Wellington and their apologists, Bonald, De Maistre, and Von Haller.

An interesting development in the field of the analysis of democracy in social and political theory has been the clarification of the definition of democracy. The early definitions were generally formalistic and concerned chiefly with such problems as distinguishing between «pure» and «representative» democracy and analyzing the political concept of democracy. Especially important has been the «democratizing» of the very conception of democracy. The old Aristotelian notion of the «people» as the upper and middle class members of society, which persisted down to the close of the 18th century, has been supplanted by the newer view which regards the people as embracing all the members of society with no exception. Consequently, the phrase «government by the people» meant quite a different thing when used by Lincoln than it did when employed by Aristotle, Cusanus, Locke or Rousseau. Again, more recent students of the subject have come to see that democracy is far more than merely a form of government. Professor Giddings, who may be taken as typical of the recent synthetic interpretation of democracy, finds that democracy is a form of government, a form of the state and a type of social organization and social control. As a form of government a «pure democracy» is held to mean the enfranchisement of the majority of the population and the direct participation of the whole mass of the citizens in the operation of all the affairs of government. The much more common «representative democracy» is defined as one in which the citizens govern indirectly through periodically selected deputies or representatives. As a form of the state democracy implies the existence of popular sovereignty. Lastly, as a form of society democracy means both a democratic organization and control of non-political forms of activity and a determination of public policy by a majority of the citizens. (For a detailed analysis of the various phases of democracy see the following article on DEMOCRACY by Professor Ellwood). Finally, a number of students of democracy, among them Prof. James Harvey Robinson, have become dissatisfied with a formalistic and static analysis of democracy, have given it a pragmatic definition and have identified it with a dynamic program. Professor Robinson, for example, holds that democracy not only requires the popular control of public policy, but also implies a type of social organization which will develop to the fullest extent the latent potentialities of every member of the society, and imposes upon society the moral obligation to do everything in its power to hasten the realization of such a condition.

Another phase of the development of the theory of democracy in the last century which can only be touched upon here is the great controversies over the merits of democracy as opposed to monarchy and aristocracy. That anyone should have thought democracy worthy of a lengthy and sustained attack or defense is significant of the growing importance of the subject, for such a thing rarely or never occurred before this period. The first phases of the controversy, following the French Revolution, were particularly acrimonious and partisan when the reactionaries, such as Burke, Bonald, DeMaistre and Von Haller bitterly attacked the new order of things and were answered in kind by its admirers such as Paine, Jefferson, Bancroft and Lamartine. The more recent echoes of the Burke-Paine controversy have been more scholarly and temperate. Maine, Lecky, Faguet, Le Bon and Treitschke have questioned the merits of democracy and they have been effectively answered by Giddings, Sumner, Lowell, Eliot and the English Liberals and Fabians. On the whole, English, French and American writers now tend to defend the efficacy of a democratic form of social and political organization, while Teutonic writers, with the exception of the Socialists, have drifted away from their mid-century liberalism and have tended more and more to defend autocracy. Both tendencies have, no doubt, been the logical outgrowth of their social and political environment.

The remaining tendency in the development of democratic theory, and that which is destined to bring the most fruitful results, has been the gradual shift of method from *à priori* mythology and generalization, setting forth what some theorists imagine democracy to be, to a real concrete and inductive study of democracy in operation and an analysis of its fundamental foundations. The first conspicuous case of a concrete study of a democracy in action was made by De Tocqueville nearly a century ago and it remained for over a half-century the only analysis of its kind. James Bryce next essayed the task with equal success in his remarkable 'American Commonwealth.' Still more recently Ostrogorski and Croly have continued this line of approach in a brilliant but less comprehensive manner. These studies, however, though epoch-making, were mainly descriptive rather than analytical. The need of a more profound analysis has been effectively stated by Mr. Graham Wallas and a number of fragmentary attempts have been made to supply this need. The impulse to this more penetrating analysis has come mainly from sociologists and economists, as the political scientists have, for the most part, been content to proceed with the further development of the external, and somewhat superficial, formalistic and legalistic line of approach to politics, which received its most effective formulation in the monumental works of Professor Burgess. Professor Beard's brilliant and original torso has for the first time presented in their true perspective the origins of American democracy. Mr. Bentley, in a profound and too little read book, has brought the methodology of Gumplowicz, Ratzenhofer and Small to bear on an analysis of that struggle of economic interests in society and politics which furnishes the only key to the understanding of so many problems in modern political life. The sociologists, particularly in America, have shown that democracy is not something which may be plucked from the clouds, but requires certain indispensable conditions in the social environment for its successful operation, and they have tried to indicate the nature of some of these indispensable prerequisites of the successful democracy. Professor Giddings, in a number of thoughtful volumes and essays, has sketched the environmental background which determines the nature of political life and organization, has pointed out the necessity of homogeneity of mental reactions for the existence of a liberal and democratic society, has attempted a harmonizing of the Aristotle-Harrington conception of the leadership of the intellectual élite with the modern view of the necessity of a democratic control in society, and has outlined the significant reasons for believing that democracy and imperialism are not mutually exclusive. Professor Ross has carried out Professor Giddings' conception of the necessity of homogeneity and general intelligence for the successful operation of a democracy and has shown by trenchant writings the grave dangers to American democracy from the carelessness and indifference of the government in allowing the unrestricted immigration of heterogeneous and ignorant elements from the «surplus populations» of Europe. Also, following out Professor Giddings' emphasis on the importance of racial and psychological homogeneity in democracy and upon the determination of political organization by the conditions in the social environment, Professor Tenney has pointed out many of the most important biological foundations and prerequisites of democracy and has sounded a note of warning against the dangers latent in the admission to the United States of peoples and classes who neither satisfy these conditions nor can be made to satisfy them by assimilation into the population. Professor Cooley, in a brilliantly written work, has analyzed, in a penetrating manner, the psychological problems inherent in the organization of democratic society on a large scale and has made numerous helpful suggestions as to how some of these perplexing problems may be solved. The students of social psychology, such as Sighele in Italy, Tarde, Durkheim and Le Bon in France, Bagehot, Wallas, MacDougall and Trotter in England, and Giddings, Sumner, Cooley and Ross in America, have analyzed the diverse phases of those socio-psychic phenomena that affect group behavior and are especially prominent in modern democracies with their predominance of urban life and the resulting increase in the volume and variety of psychic reactions, intercourse and interstimulation. Professor Ellwood, in several erudite and lucid volumes, has produced a synthesis of the chief results of the work of the social psychologists and has indicated their bearing upon the problems of politics in general and of American democracy in particular. Finally, statisticians, led by Professors Mayo-Smith and Willcox, have begun that quantitative measurement of political and social phenomena which Professors Wallas and Giddings have insisted is the only procedure which will be able to raise politics and sociology to the level of true sciences. These diverse but complementary contributions toward a concrete investigation and a fundamental analysis of the problems of democracy doubtless forecast the most fruitful tendencies in the future formulation of the «theory» of democracy. 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DEMOCRACY, The Nature of. The word “democracy” (Greek, dēmos, the people) means the rule of the “people.” The meaning of the word “people” has, however, varied from age to age, so that to understand the nature of democracy we must view it as an historical process of development.

Historical Phases of Democracy.— The conclusion of present-day anthropologists is that primitive society and primitive government were everywhere essentially democratic. That is, in primitive society there existed only natural class distinctions such as the distinctions of age, sex and capacity; and that such government as existed in primitive groups was usually based upon the customs and the opinions of the adult members of the group — the headmen, leaders or chiefs, usually being selected by the free suffrages of the group. The case of the North American Indians with their clan and tribal assemblies and councils will serve as an illustration of this “primitive democracy.” Such primitive democracies usually decided what the action of the group should be, whether it concerned the election of a peace chief, a war chief, the making of war or a penalty for some offender against tribal usages, only unanimously. A discussion was held until practically unanimous agreement was reached regarding the policy of the group, usually without formal voting.

In primitive democracies the “people” were the whole membership of the primitive group (clan or tribe) of adult age, though among some primitive peoples, such as the Australian aborigines, the women seemed to have had very little voice. The organization and functions of such primitive democracies were of the simplest sort and they were based almost wholly upon customary, we might almost say instinctive, usages. A democratic form of group control was possible in such cases because of the similarity of the habits, feelings and ideas of all members of the group.

Primitive democracy was gradually superseded during the period of barbarism, owing to the stresses and strains of the prolonged and constant warfare which characterized that stage of social evolution, especially of warfare for purposes of conquest, by more despotic types of government. The war chief became a king, usually, however, with his authority more or less limited by the tribal council. After the conquest and subjugation of one group by another centralized social control in the hands of definite authorities became even more necessary. However, the tradition that the freemen of the dominant tribe were the source of this authority persisted; and in some groups after the subjugated elements had become reconciled to their position as slaves, the freemen of the dominant or conquering group drove out their kings and distributed authority again among their own male members. Thus arose the “ancient democracies,” such as those of early Greece and Rome. These ancient democracies were of a very limited kind. The «people» in this case consisted of the freemen, the warriors, of the conquering tribe or group, while from one-half to four-fifths of the population as a whole were slaves. The democracies of classic antiquity were thus of the authoritative and coercive type. This is a point not always recognized, but which should be carefully borne in mind in considering the nature of democracy. «Primitive democracy,» as we have seen, was a democracy which sprang spontaneously from the similarity of habits, feelings and ideas of the whole group; while «ancient democracy» was the effort of a master class, or conquering group, to dominate a very much larger group with its «mores.» It was democratic only with reference to the members of this master class, while with reference to the whole population it was aristocratic or oligarchic.

The third stage of the evolution of democratic society and government, namely, «modern democracy,» is much more complex and must not be confused with the two preceding. Like primitive democracy, modern democracy means the rule of the whole adult population recognized as politically belonging to a certain group. Unlike primitive democracy, however, modern democracy does not rest upon the sympathetic and formal likemindedness of the members of the group, but rather upon that rational likemindedness which we term «public opinion.» Unlike ancient democracy, modern democracies generally recognize no subject or servile class, and of recent years, the tendency is for all adult members of the political group, whether male or female, to participate in the work of government.

In other words, *modern democracy is that form of social control in which the opinion and will of every adult member of the group enters into the determination of group behavior.* It is a phase of social evolution which attempts to reconcile individualism and collectivism. Instead of being a mere stage in social and political development, as manifestly was the case both with primitive and with ancient democracy, modern democracy believes itself to represent the final phase of social control and of political evolution. It depends not only upon the freedom of the personality of the individual, but also upon equality of social and political rights and upon the recognition of the solidarity, or fraternity, of all members of the group. Its method as a process of social control is not through the development of mere formal likemindedness in the population by coercive authority or otherwise, but rather through the development of *rational* likemindedness by means of free discussion, the untrammeled formation of public opinion and the free selection of leaders or agents of authority.

Democracy as a Form of Social Control. — The exact significance and nature of democracy in relation to social evolution will be best brought out if we consider briefly the historical succession of forms of social control. The lowest form of group control of which we know is that which rests chiefly upon the instincts and upon the correlated selective processes of the natural environment. Such control is characteristic of animal groups; but the lowest human groups of which we have knowledge show a very different type of control — that of habit, or of custom and tradition. All existing savage communities of mankind universally show this type of control and we have every reason to believe that it represents the primitive human social condition. A third form of social control is that in which the control is exercised by the despotic power of a small group of individuals over a larger group. This control, as we have seen, sprang originally from the conquest of one group by another. Such an authoritarian type of social control characterized the social and political life not only of barbarous peoples, but also of peoples in the lower and middle phases of civilization. Authoritarian or despotic control could not arise, of course, until some machinery of government had become established. The ruling class in such cases often maintained, as we have seen, democratic relations within their own group, but they established and maintained the unity of the population of the group as a whole through a fear-inspired obedience which finally established habits of solidarity. The most prominent national groups of the ancient and modern world, until very recent times, have been authoritarian societies of this sort.

A fourth and higher type of social control, however, has been gradually emerging among modern civilized nations, a type of control in which the unity of the group is secured not so much by coercive authority as through the indirect means of rational discussion, the formation of a rational public opinion and the free selection of leaders. This is what we may call «free society» in contrast with the authoritarian and custom-ruled societies of the past; and this is modern democracy. It recognizes not merely that certain rights belong to the individual as a member of the group, but also that certain functions pertain to the individual in controlling the behavior of the whole group. As Hobhouse says, «It founds the common good upon the common will, in forming which it bids every grown up, intelligent person to take a part.» Modern democracy is therefore much more than a form of the state or of government. It is rather a new phase of social evolution, a goal toward which all human history has been striving. Whether it will succeed or not obviously depends upon the effectiveness of indirect means of social control, such as education, public discussion and the possibility for vast masses of men to form rational opinions and execute rational decisions as a group; since social control and social unity are necessities of social existence. If democracy fails, obviously social control must revert to control by a master class. It is for this reason that it is rightly said that democracy is «the great adventure of modern civilization.»

In democratic societies, then, public opinion is the force which lies back of the power of all regulative institutions. Just in proportion as public opinion becomes rational and powerful can a democratic society be efficient and successful. For this reason democracies depend upon free thought, free public discussion, free assemblage and a free press. If these rights are seriously abridged, it is obvious that the whole machinery of intercommunication in the group will be hampered, that it will be impossible to compare ideas and to come to a rational judgment regarding group policies. It is only through free discussion and the formation of a public opinion untrammeled by either the prejudices and emotions of the whole group or by the interests and power of some special class, that democracy can be what Mazzini declared it should be, «the progress of all through all, under the leadership of the best and wisest.»

There has been much debate whether the principle of democracy should be liberty or equality. In practice, however, both absolute liberty and absolute equality are destructive of democracy. Too great liberty has been found to lead to the exploitation of the weak by the strong and indeed to the negation of all government and all forms of social control. In brief, it leads to anarchy. On the other hand, nothing has been more destructive of democracy than attempts to realize in social and political life an absolute or dead-level equality. In this case, social efficiency and liberty both are destroyed. The greatest degree of absolute equality in society, indeed, seems more compatible with certain forms of autocracy than with democracy. For this reason social and political writers have usually concluded that democracy rests upon, not absolute, but relative liberty and equality among citizens. The truth seems to be, however, that the liberty and equality of democracy, if not socially destructive, must both rest upon another principle, that of «fraternity.» By fraternity we mean such sympathy, understanding and good will among the members of the group that what they do collectively is a spontaneous expression of the inner psychic unity of the whole group, or at least of a large majority of its members. Democracy, in this sense, doubtless remains largely a social and political ideal but such sympathy, likemindedness and good will are the necessary sociological bases of successful democracy.

In answering the question, «Upon what basis have free communities risen and flourished?» Professor Giddings very rightly replies: «Always this: the people that have made them and maintained them have been sufficiently likeminded, sufficiently alike in their purposes, in their morals, in their ambitions and ideals, in their views of policy and method, to work together spontaneously. Naturally there has been among them what the old Roman lawyers called 'a meeting of minds,' so that without a whip over them, or a strong hand to hold them together they have collectively carried on the struggle for existence and advantage, freely and effectively. They have all seen the same truth; they have all wanted the same success, they have striven by the same method for the realization of the same great purpose.»

Democracy as a Form of the State and of Government.— As a form of the state democracy means what is ordinarily called «popular sovereignty.» It is the like participation of all adults in creating the actual power that is sovereign in the state at any given time. As a form of government democracy is the actual rule through universal suffrage of the citizens taken as a mass. Unlike primitive democracies, modern democracies have found it necessary to adopt the principle of «majority rule» in reaching political decisions. Unanimity is not possible in the great complex societies of modern civilization. Decisions upon public policies and leaders to carry out these policies are usually reached, therefore, by a majority vote. Unfortunately, in this method there is always a danger that the result will be a compromise and that the will of the group will not be effectively behind the proposed change. Definite social choice, in other words, has not really been reached and the whole situation remains unstable. It is obvious, however, that in such cases what is lacking is a sufficient development of consciousness on the part of the group regarding the situation as a whole. With further discussion a more fully developed social consciousness and a social decision can be reached which are truly representative of the will of the group. The dangers of majority rule in complex modern societies can best be met, therefore, by such means of public education as will arouse fully social consciousness regarding any given situation. This again, of course, shows that modern democracy to be successful depends upon highly developed intelligence and patriotism in the individual citizen.

Much has been made of the distinction between «pure» and «representative» democracies. The pure democracies are those in which questions of public policy are settled by the meeting of men in mass, such as in the assembly of primitive democracies, in the cantonal meetings in Switzerland and in the New England town meeting. Government by assembly, or by mass meetings, however, is quite impossible in complex societies, even though there are certain advantages in the way of securing unanimity and mutual understanding in such a system. If means of intercommunication are sufficiently highly developed and kept untrammeled, moreover, there is no reason why democratic government should not work equally successfully under the system of delegated representatives. Popular control in representative democracies obviously depends upon some system for the «recall» of officials, when elected, at the will of the electors, if they are not found to be truly representative. For the same reason the initiative and referendum are necessary means of completing representative democracy in the field of legislation. Where these methods work badly, as it must be acknowledged that they often do, it is because democracy itself has failed through the lack of intelligence and patriotism on the part of the people. In all the democratic nations of the present, the tendency is toward more direct government; and this on the whole is probably to be commended, for the exercise of the responsibilities of government is itself an education. If democracies are to be a success, the whole mass of citizens must be trained in the knowledge and art of self-government.

Whether democracies are «absolute» governments or not has also been a much debated question. Rousseau and perhaps a majority of the popular exponents of democracy have held that democratic rule is «absolute,» not less than autocratic rule, since «sovereignty» by its very nature must be absolute. In practice, however, democratic governments have usually refrained from exercising absolute control over many things, such as the opinions, beliefs and practices of the people in religion and in many other matters. "Limited majority rule," instead of "absolute majority rule," is coming more and more to be recognized as the safest principle of democracy, since the belief in the absolute state, whether democratic or autocratic, is seen to be contrary to the practices of the most enlightened democracies and fraught with danger to the democratic principle itself, as under "absolute" democracy freedom of thought, speech and conduct may easily be entirely lost.

Modern democracy is, however, far from giving allegiance to the principle that "that government is best which governs least." On the contrary, modern democratic government is constantly extending its functions and recognizes that government as an agency of social control is coextensive, as Mill said, with human interests. Nevertheless, a too rapid extension of the functions of government may prove impracticable or dangerous under present conditions. This is especially true of democratic governments, because they depend so much upon the development of intelligence and character in the individual citizen. Again, it must be remembered that even democratic governments in their control of social life are limited in their direct action to relatively external conditions and that their success depends not so much upon their power of coercing the individual as upon eliciting his initiative and co-operation.

Democracy as a Form of Industry.— It must be acknowledged that a democratically organized industry would be something very far removed from traditional modern capitalism. It would imply the giving of a large voice in the management of industry to the workers; it would also imply the giving of equal remuneration for equal services; finally, it would imply fraternity in the management of industrial enterprises and in industrial life generally. Whether such a democratization of industry implies complete government ownership or not, we need not here discuss. Obviously, it does imply such a collective control of industry that the opinion and will of every individual in the political group will count in the determination of industrial policies. This implication of democracy is being rapidly perceived by all democratic nations; and democratic governments are now accordingly rapidly developing their control over industry in the interests of democracy. Socialism, in this moderate sense of democratic control and regulation of industry in the interests of public welfare, would seem near realization in the immediate future in all fully democratic nations.

However, the relations between democracy and the modern socialistic movement are very complex. Socialists are wont to claim that socialism is simply democracy carried over into industrial relations. But many socialists favor, not democracy as we have defined it, but rather working-class domination. Apparently many socialists wish the establishment of socialism whether it comes through the wishes of the majority of citizens or not. This particular class of socialists we may call the revolutionary socialists, as they are not inclined to wait for the coming of socialism through the working of democratic machinery. Quite recently some prominent German socialists have claimed that socialism will depend for its successful development, not upon a democratic, but upon a bureaucratic, social and political organization.

Democracy as a Form of Social Life.— In its essence, as we have seen, democracy is a form of social control; but social control is broader than government, extending even to the more intimate relations of individuals in society. Democracy is gradually coming to expression in these relations, also. Thus in the family life, we find the authoritative family to be passing and a more democratic type of the family to be evolving. In the democratic family quite evidently a larger measure of liberty and equality must be introduced; but here as elsewhere in democratic society, fraternity, even more than liberty and equality, is necessary if a democratic type of family life is to succeed. A larger and larger measure of democracy is, indeed, being introduced into all of the "free associations" and the institutions of society. Churches are gradually becoming more democratic in their spirit, although older forms of governmental organization may persist. Even schools are trying out the principles of self-government. In the still more intimate personal relations of social life the most advanced democratic peoples are striving to realize a higher degree of liberty and equality among their members. But in these more intimate relations democracy has developed slowly and relatively unevenly, because here perhaps more than anywhere else in the social life, democracy is dependent upon fraternity, that is, upon sympathy, understanding and good will.

Democracy and Social Efficiency.— Critics of democracy, such as Lecky, have always pointed out that democracy is apt to mean the control of ignorance and mediocrity and so is incompatible with social and political efficiency. The Great War has brought this question again to the forefront in democratic nations and some even claim that it will decide the matter. It may be pointed out that whether democracy means the control of the inefficient and mediocre will altogether depend upon circumstances. Doubtless the mass of men can never be trained to be experts in the work of government and of social control generally; and such work, it may be admitted, in order to be efficient, must always be done mainly by experts. However, the masses can be taught to select intelligently their leaders, and with patriotic rather than selfish ends in view; and in the long run the mass of the group are more to be trusted in the determination of group policies than any governing class, however wise that class may be. Democracies, then, can be equally efficient, probably more efficient, than autocracies, when all of their members have been trained so that they will take and play intelligently their part in the social life spontaneously, and not through coercion from above.

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DEMOCRATIC PARTY, The, one of the chief political organizations in the United States. To Thomas Jefferson belongs the honor of being the founder, and for a third of a century the undisputed leader, of the Democratic party. Scarcely had the present Constitution been adopted before there appeared a line more or less distinct dividing those who, like Jefferson (q.v.), believed the people fully capable of self-government and trusted them, and those who, like Hamilton (q.v.), thought that the masses needed to be under the control of a strong and centralized government. This fundamental difference of opinion manifested itself in the treatment of every important question, and party organizations were soon perfected.

As Jefferson himself has described the birth of parties in the United States, his opinion can be accepted as authoritative. In a letter written in June 1823, near the close of his life, to William Johnson, he said:

> At the formation of our government, many had formed their political opinions on European writings and practices, believing the experience of old countries, and especially of England abusive as it was, to be a safer guide than mere theory. The doctrines of Europe were that men in numerous associations cannot be restrained within the limits of order and justice, but by forces physical and moral, wielded over them by authorities independent of their will. Hence their organization of kings, hereditary nobles, and priests. Still further to constrain the brute force of the people, they deem it necessary to keep them down by hard labor, poverty and ignorance, and to take from them as from bees, so much of their earnings, as that unremitting labor shall be necessary to obtain a sufficient surplus barely to sustain a scanty and miserable life. And these earnings they apply to maintain their privileged orders in splendor and idleness, to fascinate the eyes of the people, and excite in them an humble adoration and submission, as to an order of superior beings. Although few among us had gone all these lengths of opinion, yet many had advanced, some more, some less, on the way. And in the convention which formed our government, they endeavored to draw the cords of power as tight as they could obtain them, to lessen the dependence of the general functionaries on their constituents, to subject to them those of the States, and to weaken their means of maintaining the steady equilibrium which the majority of the convention had deemed salutary for both branches, general and local. To recover, therefore, in practice the powers which the nation had refused and to warp to their own wishes those actually given, was the steady object of the Federal party. Ours, on the contrary, was to maintain the will of the majority of the convention and of the people themselves. We believed, with them, that man was a rational animal endowed by nature with rights and with an innate sense of justice; and that he could be restrained from wrong and protected in right, by moderate powers confided to persons of his own choice, and held to their duties by dependence on his own will. We believe that the complicated organization of kings, nobles, and priests, was not the wisest nor best to effect the happiness of associated man; that wisdom and virtue were not hereditary; that the trappings of such a machinery, consumed by their expense, those earnings of industry they were meant to protect, and, by the inequalities they produced, exposed liberty to sufferance. We believe that men, enjoying in ease and security the full fruits of their own industry, enlisted by all their interests on the side of law and order, habituated to think of themselves and to follow their reason as their guide, would be more easily and safely governed, than with minds nourished in error and vitiated and debased, as in Europe, by ignorance, indigence, and oppression. The cherishment of the people then was our principle, the fear and distrust of them that of the other party. Composed, as we were, of the landed and laboring interests of the country, we could not be less anxious for a government of law and order than were the inhabitants of the cities, the strongholds of federalism. And whether our efforts to save the principles and form of our Constitution have not been salutary, let the present republican freedom, order, and prosperity of our country determine.

Jefferson not only gave a history of the formation of parties, but fortunately for later generations, he enumerated the elements which each party contained. In a letter to C. E. Ebeling in 1795 he said:

> Two parties exist within the United States. They embrace respectively the following descriptions of persons. The Anti-Republicans consist of: (1) The old Refugees and Tories; (2) British merchants residing among us, and composing the main body of our merchants; (3) American merchants trading on British capital, another great portion; (4) speculators and holders in the banks and public funds; (5) officers of the Federal government with some exceptions; (6) office hunters willing to give up principles for places,—a numerous and noisy tribe; (7) nervous persons, whose languid fibres have more analogy with a passive than active state of things. The Republican party of our Union comprehends: (1) The entire body of landholders throughout the United States; (2) the body of laborers not being landholders whether in husbanding or the arts. The latter is to the aggregate of the former party probably as 500 to 1; but their wealth is not as disproportionate, though it is also greatly superior and is in truth the foundation of that of their antagonists. Trifling as are the numbers of the Anti-Republican party, there are circumstances which give them an appearance of strength and numbers. They all live in cities together, and can act in a body and readily at all times; they give chief employment to the newspapers, and, therefore, have most of them under their command. The agricultural interests are dispersed over a great extent of country, have little means of intercommunication with each other, and feeling their own strength and will, are conscious that a single exertion of these will at any time crush the machinations against their government.

Jefferson's philosophical mind sought not only the facts, but the reason for the facts, and in 1824, in a letter to Mr. Lee, he thus classified men according to their party tendencies:

> Men by their constitutions are naturally divided into two parties: (1) Those who fear and distrust the people and wish to draw all powers from them into the hands of the higher classes; (2) those who identify themselves with the people, have confidence in them, cherish and consider them as the most wise depositary of the public interests. In every country these two parties exist, and in every one where they are free to think, speak, and write, they will declare themselves. Call them, therefore, liberals and serviles, Jacobins and ultras, Whigs and Tories, Republicans and Federalists, aristocrats and Democrats, or by whatever name you please, they are the same parties still, and pursue the same object. The last appellation of aristocrats and Democrats is the true one expressing the essence of all.

Jefferson's purpose was to found a party that would be really democratic in personnel, in purpose and in method. The party, however, was at first called the Republican party, and afterward the Democratic-Republican party. It was not until in Jackson's time that it became universally known by its present name. As there were no national conventions and no national platforms in the early days of the Republic the position of the party on public questions must be gathered from the words and speeches of the leaders and from the votes of the members of the party in Congress. Jefferson's first inaugural address contained the essence of the party creed as generally accepted during the first quarter of the 19th century. In fact, it is still the creed of the party, and no group of men desiring to maintain an influence in the party can even now admit any essential departure from it. It will be found below:

> About to enter, fellow-citizens, on the exercise of duties which comprehend everything dear and valuable to you,

> it is proper you should understand what I deem the essential principles of our government, and consequently those which ought to shape its administration. I will compress them within the narrowest compass they will bear, stating the general principle, but not all its limitations. Equal and exact justice to all men, of whatever State or persuasion, religious or political; peace, commerce, and honest friendship with all nations, entangling alliances with none; the support of the State governments in all their rights, as the most competent administrations for our domestic concerns and the surest bulwarks against Anti-Republican tendencies; the preservation of the general government in its whole constitutional vigor, as the sheet anchor of our peace at home and safety abroad; a jealous care of the right of election by the people — a mild and safe corrective of abuses which are lopped by the sword of revolution where peaceable remedies are unprovided; absolute acquiescence in the decisions of the majority, the vital principle of republics, from which is no appeal but to force, the vital principle and immediate parent of despotism; a well-disciplined militia, our best reliance in peace and for the first moments of war, till regulars may relieve them; the supremacy of the civil over the military authority; economy in the public expense that labor may be lightly burthened; the honest payment of our debts and sacred preservation of the public faith; encouragement of agriculture, and of commerce as its handmaid; the diffusion of information and arraignment of all abuses at the bar of the public reason; freedom of religion, freedom of the press, and freedom of person under the protection of the *habeas corpus*, and trial by juries impartially selected. These principles form the bright constellation which has gone before us and guided our steps through an age of revolution and reformation. The wisdom of our sages and blood of our heroes have been devoted to their attainment. They should be the creed of our political faith, the text of civic instruction, the touchstone by which to try the services of those we trust; and should we wander from them in moments of error or of alarm, let us hasten to retrace our steps and to regain the road which alone leads to peace, liberty, and safety.

The first and most fundamental difference between the Democratic party (when it was known as the Republican party, afterward as the Democratic-Republican party and to-day as the Democratic party) and the party which has opposed it (first known as the Federal party, then as the Whig party and more recently as the Republican party) was upon the construction of the Constitution. The former party has insisted upon a strict construction, while the latter has leaned toward a liberal construction of the Federal Constitution. This difference is a natural one for the Democratic party, believing in the right of the people to, and in the capacity of the people for, self-government, has insisted upon giving them as large a part as possible in the control of their own affairs.

It follows, therefore, that the Democratic party favors local self-government and opposes the centralization of power in remote centres. It believes that the nearer the people are to their government the more effective will be their control over it. The various parties that have opposed the Democratic party have given more or less emphasis to the Hamiltonian view and have increased the power of the representative at the expense of the constituents.

While this distinction has not at all times been clearly marked, and while these views have not been held by all the individual members, the general tendency has existed.

In the very beginning this tendency was illustrated in the Alien and Sedition laws enacted by the Federalists and in the Kentucky and Virginia resolutions supported by the Democrats. (See ALIEN AND SEDITION ACTS; also KENTUCKY RESOLUTIONS and VIRGINIA RESOLUTIONS). Both parties in this instance went to the extreme, the Federalists attempting to confer dangerous power upon the Federal government, the Democrats asserting views which were afterward so misconstrued as to weaken the Federal Union. The preservation of the balance between the Federal government and the State governments has always been a delicate matter, and as the line cannot be drawn with mathematical accuracy there has always been room for dispute; the public sentiment having gone to the one side or the other as it was necessary to maintain the equilibrium. It is likely that this discussion will continue, but the efforts to carry the government to an extreme in either direction will be thwarted by the conservative middle class, which rallies to the support of the side that is attacked.

Beginning with Jefferson's administration in 1801, and continuing to the end of Monroe's administration in 1825, the Democratic party held undisputed sway in the nation. Jefferson, like Washington, refused to consider a third term, and his Secretary of State, James Madison (q.v.), succeeded him. Madison, following the example set by his predecessor, retired at the end of his second term, and James Monroe (q.v.), who had been his Secretary of State, succeeded him.

The War of 1812 was conducted by the Madison administration, and it was during this period that the Hartford resolutions were adopted by a convention of Federalists which met at Hartford, Conn., in December 1814. These resolutions went further in the direction of States rights than either the Kentucky resolutions or the Virginia resolutions. They began by recommending "to the legislatures of the several States represented in this convention, to adopt all such measures as may be necessary effectually to protect the citizens of said States from the operation and effects of all acts which have been or may be passed by the Congress of the United States, which shall contain provisions subjecting the militia or other citizens to forcible drafts, conscriptions, or impressments not authorized by the Constitution of the United States."

While the Hartford resolutions announced a political policy, they had their origin in the commercial interests which were affected by the War of 1812 and by the embargo act (see EMBARGO) which was enacted as a war measure.

The Federal party which supported Clinton's candidacy in 1812 laid great stress upon the commercial interests. The platform adopted by the New York Federalists urged the election of Clinton as the surest method of guaranteeing the protection of those commercial interests which were flagging "under the weakness and imbecility of the administration." The Federalists attacked what they called the Virginia regency, and the Hartford resolutions recommended a constitutional amendment making the President ineligible for renomination, and another prohibiting the selection of two Presidents in succession from the same State.

It was during the administration of James Monroe that the doctrine, afterward known by his name, and followed ever since, was promulgated. The doctrine was set forth in a message sent to Congress by James Monroe on 2 Dec. 1823. (See MONROE DOCTRINE). The following is the text covering this subject:

> In the wars of European powers, in matters relating to themselves, we have never taken any part, nor does it comport with our policy so to do. It is only when our rights are invaded or seriously menaced that we resent injuries or make preparations for our defense. With the movements on this hemisphere we are, of necessity, more

immediately connected, and by causes which must be obvious to all enlightened and impartial observers. The political system of the allied powers (the Holy Alliance) is essentially different in this respect from that of America. This difference proceeds from that which exists in their respective governments. And to the defense of our own, which has been achieved by the loss of so much blood and treasure, and matured by the wisdom of their most enlightened citizens and under which we have enjoyed unexampled felicity, this whole nation is devoted. We owe it, therefore, to candor and to the amicable relations existing between the United States and those powers to declare that we should consider any attempt on their part to extend their system to any portion of this hemisphere as dangerous to our peace and safety. With the existing colonies or dependencies of any European power we have not interfered, and shall not interfere. But with the governments who have declared their dependence and maintained it we have on great consideration and on just principles, acknowledged we could not view any interposition for the purpose of oppressing them, or controlling in any other manner their destiny, by any European power, in any other light than as the manifestation of an unfriendly disposition toward the United States. Our policy in regard to Europe, which was adopted at an early stage of the wars which have so long agitated that quarter of the globe, nevertheless remains the same, which is not to interfere in the internal concerns of any of its powers; to consider the government de facto as the legitimate government for us; to cultivate friendly relations with it, and to preserve those relations by a frank, firm, and manly policy; meeting in all instances the just claims of every power, submitting to injuries from none. But in regard to those continents, circumstances are eminently and conspicuously different. It is impossible that the allied powers should extend their political system to any portion of either continent without endangering our peace and happiness; nor can any one believe that our southern brethern, if left to themselves, would adopt it of their own accord. It is equally impossible, therefore, that we should behold such interposition, in any form, with indifference.

This message was written after consultation with Jefferson, who was then living in retirement at Monticello. The following extract from a letter written by Jefferson to Monroe in October 1823 not only shows Jefferson's part in the formulation of the doctrine, but also proves his foresight and his comprehension of American interests and his devotion to the welfare of his country:

The question presented by the letters you have sent me, is the most momentous which has been offered to my contemplation since that of Independence. That made us a nation, this sets our compass and points the course which we are to steer through the ocean of time opening on us. And never could we embark on it under circumstances more auspicious. Our first and fundamental maxim should be, never to entangle ourselves in the broils of Europe. Our second, never to suffer Europe to intermeddle with cis-Atlantic affairs. America, North and South, has a set of interests distinct from those of Europe and peculiarly her own. She should, therefore, have a system of her own, separate and apart from that of Europe. While the last is laboring to become the domicile of despotism, our endeavor should surely be to make our hemisphere that of freedom. One nation most of all, could disturb us in this pursuit; she now offers to lead, aid, and accompany us in it. By acceding to her proposition, we detach her from the bands, bring her mighty weight into the scale of free government, and emancipate a continent at one stroke, which might otherwise linger long in doubt and difficulty. Great Britain is the nation which can do us the most harm of any one, or all on earth; and with her on our side we need not fear the whole world. With her, then, we should most sedulously cherish a cordial friendship; and nothing would tend more to knit our affections than to be fighting once more side by side in the same cause. Not that I would purchase even her amity at the price of taking part in her wars. But the war in which the present proposition might engage us, should that be its consequence, is not her war, but ours. Its object is to introduce and establish the American system, of keeping out of our land all foreign powers, of never permitting those of Europe to intermeddle with the affairs of our nations. It is to maintain our own principle, not to depart from it. And if to facilitate this, we can effect a division in the body of the European powers, and draw over to our side its most powerful member, surely we should do it. But I am clearly of Mr. Canning's opinion, that it will prevent instead of provoke war. With Great Britain withdrawn from their scale and shifted into that of our two continents, all Europe combined would not undertake such a war. For how would they propose to get at either enemy without superior fleets? Nor is the occasion to be slighted which this proposition offers, of declaring our protest against the atrocious violations of the rights of nations by the interference of any one in the internal affairs of another, so flagitiously begun by Bonaparte, and now continued by the equally lawless Alliance calling itself Holy. But we have first to ask ourselves a question. Do we wish to acquire to our own confederacy any one or more of the Spanish provinces? I candidly confess that I have ever looked on Cuba as the most interesting addition which could ever be made to our system of States. The control which, with Florida Point, this island would give us over the Gulf of Mexico, and the countries and isthmus bordering on it, as well as all those whose waters flow into it, would fill up the measure of our political well-being. Yet I am sensible that this can never be obtained, even with her own consent, but by war; and as its independence, which is our second interest (and especially its independence of England), can be secured without it, I have no hesitation in abandoning my first wish to future chances and accepting its independence, with peace and the friendship of England, rather than its association, at the expense of war and her enmity. I could honestly, therefore, join in the declaration proposed, that we aim not at the acquisition of any of those possessions, that we will not stand in the way of any amicable arrangement between them and the mother country; but that we will oppose, with all our means, the forcible interposition of any other power, as auxiliary, stipendiary, or under any other form or pretext, and most especially, their transfer to any power by conquest, cession, or acquisition in any other way.

Jefferson died on 4 July 1826, just 50 years after the signing of the Declaration of Independence. Two years before his demise the second great Democratic leader had made his entrance into the arena of politics.

Andrew Jackson (q.v.) of Tennessee, the hero of the War of 1812, had grown in fame and popularity from the day of his victory over the English at New Orleans. In 1824 he became the nominee of his party, and in the election following received 155,872 votes, as against 105,321 cast for John Quincy Adams; 44,282 cast for Crawford; and 46,587 cast for Henry Clay. In the Electoral College Jackson received 99 votes, Adams 84, Crawford 41 and Clay 37. As no one of the candidates had a majority in the Electoral College the election of the President devolved upon the House of Representatives; and by a coalition between the friends of Adams and the friends of Clay, the former received the votes of 13 States, while Jackson received but 7 and Crawford 4.

The defeat of Jackson after he had secured a large plurality of the popular vote, and a considerable plurality in the Electoral College, aroused great partisan feeling, and from that time until 1828 Jackson was the candidate of the party, his campaign growing in strength as the years proceeded until when election day arrived he had a popular majority of nearly 140,000 and a majority of nearly 100 in the Electoral College. Calhoun was chosen Vice-President at the same time.

The chief features of Jackson's administration were his treatment of the nullification act of the South Carolina legislature and his veto of the act for the rechartering of the United States bank. He took vigorous steps to enforce the Federal authority and, in an elaborate message, presented the arguments against the right of secession with a force and clearness never since surpassed. His action in this matter resulted in the alienation of John C. Calhoun, who up to that time had been a staunch political friend.

The fight over the bank charter not only occupied a large part of the time of his administration, but resulted in a controversy that permeated other issues. The Senate passed a resolution censuring him for removing the deposits from the bank, and this became an issue. Under the leadership of Thomas H. Benton, of Missouri, the Democrats began a fight for the reversal of the action of the Senate, and finally secured a majority of that body and expunged the resolution.

While Jackson's military achievements were the foundation for his early popularity, his great political fame was due to championing the cause of the masses, as against the concentrated power of wealth. In his message vetoing the bank charter he presented with emphasis and accuracy the Democratic view of the sphere of government. He said:

> Distinctions in society will always exist under every just government. Equality of talents, of education, or of wealth, cannot be produced by human institutions. In the full enjoyment of the gifts of heaven and the fruits of superior industry, economy, and virtue, every man is equally entitled to protection by law. But when the laws undertake to add to those natural and just advantages artificial distinctions — to grant titles, gratuities, and exclusive privileges — to make the rich richer and the potent more powerful — the humbler members of society — the farmers, mechanics, and the laborers — who have neither the time nor the means of securing like favors for themselves, have a right to complain of the injustice of their government.

Jackson's position on the bank charter represented the views of his party adherents. His veto was sent to Congress on 10 July 1831, and it was the main issue of the campaign of 1832, when, with Henry Clay as his opponent, he secured a popular plurality of 157,000. In the Electoral College he had 219 votes as against 49 cast for Clay. His Secretary of State, Martin Van Buren, succeeded him as the Democratic candidate and was elected, having both a popular majority and a majority in the Electoral College. Van Buren defeated William Henry Harrison in that year, and was defeated by him in the following campaign. In the earlier campaigns the nominations were made by a Congressional caucus, or by the various States, but Jackson's renomination in 1832 was made by a national convention held at Baltimore, and Van Buren was nominated by a convention held at the same place four years later.

In 1840 the Democratic convention was again held at Baltimore, Van Buren was renominated and a lengthy platform was adopted. As this platform was the basis of all platforms adopted from that time to the breaking out of the Civil War it is worthy of reproduction. It was as follows:

> 1. Resolved, That the Federal government is one of limited powers, derived solely from the Constitution, and the grants of powers shown therein ought to be strictly construed by all the departments and agents of the government, and that it is inexpedient and dangerous to exercise doubtful constitutional powers.
>
> 2. Resolved, That the Constitution does not confer upon the general government the power to commence and carry on a general system of internal improvements.
>
> 3. Resolved, That the Constitution does not confer authority upon the Federal government directly or indirectly, to assume the debts of the several States, contracted for local internal improvements or other State purposes; nor would such assumption be just or expedient.
>
> 4. Resolved, That justice and sound policy forbid the Federal government to foster one branch of industry to the detriment of another, or to cherish the interests of one portion to the injury of another portion of our common country — that every citizen and every section of the country has a right to demand and insist upon an equality of rights and privileges, and to complete and ample protection of persons and property from domestic violence or foreign aggression.
>
> 5. Resolved, That it is the duty of every branch of the government to enforce and practice the most rigid economy in conducting our public affairs, and that no more revenue ought to be raised than is required to defray the necessary expenses of the government.
>
> 6. Resolved, That Congress has no power to charter a United States bank; that we believe such an institution one of deadly hostility to the best interests of the country, dangerous to our Republican institutions, and the liberties of the people, and calculated to place the business of the country within the control of a concentrated money power and above the laws and the will of the people.
>
> 7. Resolved, That Congress has no power under the Constitution to interfere with or control the domestic institutions of the several States; and that such States are the sole and proper judges of everything pertaining to their own affairs, not prohibited by the Constitution; that all efforts by abolitionists or others, made to induce Congress to interfere with questions of slavery or to take incipient steps in relation thereto, are calculated to lead to the most alarming and dangerous consequences, and that all such efforts have an inevitable tendency to diminish the happiness of the people, and endanger the stability and permanence of the Union, and ought not to be countenanced by any friend to our political institutions.
>
> 8. Resolved, That the separation of the moneys of the government from banking institutions is indispensable for the safety of the funds of the government and the rights of the people.
>
> 9. Resolved, That the liberal principles embodied by Jefferson in the Declaration of Independence, and sanctioned in the Constitution, which make ours the land of liberty and the asylum of the oppressed of every nation, have ever been cardinal principles in the Democratic faith; and every attempt to abridge the present privilege of becoming citizens, and the owners of soil among us ought to be resisted with the same spirit which swept the Alien and Sedition laws from our statute book.

As the names of several different persons had been presented for Vice-President the convention of 1840 made no nominations for that office, but adopted resolutions leaving the decision to members of the party in the various States, and trusting that "before the election took place the opinion would be so concentrated as to enable the Electoral College to secure the choice of a Vice-President."

Upon the death of Harrison, John Tyler became President, and during his term vetoed two bills which had for their object the re-establishing of the United States bank. Tyler favored the annexation of Texas, which had separated from Mexico and had existed under an independent government since 1836. Jas. K. Polk, the Democratic candidate, also favored annexation, while Henry Clay, for a third time a candidate for the Presidency, opposed annexation.

In the platform of 1844, the first nine resolutions of the platform of 1840 were reaffirmed, and new resolutions added demanding, first, that the proceeds of public lands be sacredly applied to the national object specified in the Constitution, rather than distributed among the States; second, sustaining and defending the veto of the President which had "thrice saved Americans from the corrupt and tyrannical domination of the Bank of the United States," and third, declaring for the annexation of Texas. The campaign resulted in the election of Polk and Dallas, although their majority in the Electoral College was proportionately larger than their popular plurality.

The campaign of 1848 was waged with Lewis Cass of Michigan and William O. Butler of Kentucky as the Democratic candidates for President and Vice-President. The platform of 1848 reaffirmed that of 1840 and 1844, and added new planks covering new questions. Resolution No. 19 of the platform of 1848 is given below because it reiterates the Democratic contention in regard to the value of self-government. It reads:

> Resolved, That in view of the recent development of this grand political truth, of the sovereignty of the people and their capacity and power for self-government, which is prostrating thrones and erecting republics on the ruins of despotism in the Old World, we feel that a high and sacred duty is devolved, with increased responsibility, upon

> the Democratic party of this country, as the party of the people, to sustain and advance among us constitutional liberty, equality, and fraternity, by continuing to resist all monopolies and exclusive legislation for the benefit of the few at the expense of the many, and by a vigilant and constant adherence to those principles and compromises of the Constitution, which are broad enough and strong enough to embrace and uphold the Union as it was, the Union as it is, and the Union as it shall be, in the full expansion of the energies and capacity of this great and progressive people.

The Whig candidates, however, Zachary Taylor and Millard Fillmore, were successful that year, having both a popular majority and a majority in the Electoral College. In the campaign of 1852 Franklin Pierce of New Hampshire and William R. King of Alabama were the Democratic nominees, and the platform reiterated the leading planks of 1840, 1844 and 1848.

The platform of 1852 also reiterated the principles laid down in the Kentucky and Virginia resolutions and defended the Mexican War "as just and necessary." The campaign of 1852 resulted in an overwhelming Democratic victory, the popular plurality being more than 200,000.

The slavery question was constantly growing in prominence, and at last exerted an influence upon every issue that arose. The position taken by the various parties in regard to the Mexican War was largely determined by the slavery views held by the members of the parties.

The Fugitive Slave laws of the various States also came up for consideration, and each election showed an increase in the anti-slavery sentiment. In 1856 the Democratic platform again reaffirmed the principles set forth in 1840 and reiterated in subsequent campaigns. It quoted resolution 7 of the platform of 1840, and said:

> That the foregoing proposition covers, and was intended to embrace, the whole subject of slavery agitation in Congress; and, therefore, the Democratic party of the Union, standing on this national platform, will abide by, and adhere to, a faithful execution of the acts known as the compromise measures settled by the Congress of 1850, "the act for reclaiming fugitives from service labor" included; which act, being designed to carry out an express provision of the Constitution, cannot, with fidelity thereto, be repealed, or so changed as to destroy or impair its efficiency; that the Democratic party will resist all attempts at renewing in Congress, or out of it, the agitation of the slavery question, under whatever shape or color the attempt may be made.

The Republican party took the name by which the Democratic party was originally known, and it held its first national convention in 1856, John C. Fremont and William L. Dayton being the nominees. James Buchanan and John C. Breckinridge were the Democratic nominees. They received a majority of 60 in the Electoral College and a popular plurality of about 500,000. The American party, led by Millard Fillmore and Andrew J. Donelson, secured only eight electors but polled 874,000 votes. During the Buchanan administration the Dred Scott decision was rendered, and this, while it was a legal victory for the friends of slavery, resulted in an anti-slavery agitation that inured to the advantage of the Republican party.

In 1860 the conflict between the Northern and Southern Democrats became irreconcilable, and the Charleston convention, which met 23 April, having failed to harmonize the differences, adjourned without a nomination. The Northern Democrats met at Baltimore 18 June and nominated Stephen A. Douglas of Illinois for President and Herschel V. Johnson of Georgia for Vice-President, while the Southern wing of the party met at the same place 10 davs later and nominated John C. Breckinridge of Kentucky for President and Joseph Lane of Oregon for Vice-President. As the Douglas platforms adopted at that time represented the positions taken by the two wings of the party they will be found below:

> 1. Resolved, That we, the Democracy of the Union in convention assembled, hereby declare our affirmance of the resolutions unanimously adopted and declared as a platform of principles by the Democratic convention at Cincinnati, in the year 1856, believing that Democratic principles are unchangeable in their nature when applied to the same subject matters; and we recommend, as the only further resolutions, the following:
>
> Inasmuch as differences of opinion exist in the Democratic party as to the nature and extent of the powers of a Territorial legislature, and as to the powers and duties of Congress, under the Constitution of the United States, over the institution of slavery within the Territories.
>
> 2. Resolved, That the Democratic party will abide by the decisions of the Supreme Court of the United States on the question of constitutional law.
>
> 3. Resolved, That it is the duty of the United States to afford ample and complete protection to all its citizens whether at home or abroad, and whether native or foreign.
>
> 4. Resolved, That one of the necessities of the age, in a military, commercial, and postal point of view, is speedy communication between the Atlantic and Pacific States; and the Democratic party pledge such constitutional government aid as will insure the construction of a railroad to the Pacific coast at the earliest practicable period.
>
> 5. Resolved, That the Democratic party are in favor of the acquisition of the island of Cuba, on such terms as shall be honorable to ourselves and just to Spain.
>
> 6. Resolved, That the enactments of State legislatures to defeat the faithful execution of the Fugitive Slave Law are hostile in character, subversive of the Constitution, and revolutionary in their effect.
>
> 7. Resolved, That it is in accordance with the true interpretation of the Cincinnati platform, that, during the existence of the Territorial governments, the measure of restriction, whatever it may be, imposed by the Federal Constitution on the power of the Territorial legislature over the subject of domestic relations, as the same has been or shall hereafter be finally determined by the Supreme Court of the United States, shall be respected by all good citizens, and enforced with promptness and fidelity by every branch of the general government.

The "Breckinridge platform" was as follows:

> Resolved, That the platform adopted by the Democratic party at Cincinnati be affirmed, with the following explanatory resolutions:
>
> 1. That the government of a Territory, organized by an act of Congress is provisional and temporary; and, during its existence, all citizens of the United States have an equal right to settle, with their property in the Territory, without their rights, either of person or property, being destroyed or impaired by congressional or territorial legislation.
>
> 2. That it is the duty of the Federal government, in all its departments, to protect when necessary, the rights of persons and property in the Territories, and wherever else its constitutional authority extends.
>
> 3. That when the settlers in a Territory having an adequate population, form a State Constitution in pursuance of law, the right of sovereignty commences, and, being consummated by admission into the Union, they stand on an equal footing with the people of the other States, and the State thus organized ought to be admitted into the Federal Union, whether its Constitution prohibits or recognizes the institution of slavery.
>
> 4. That the Democratic party are in favor of the acquisition of the island of Cuba, on such terms as shall be honorable to ourselves, and just to Spain, at the earliest practicable moment.
>
> 5. That the enactments of State legislatures to defeat the faithful execution of the Fugitive Slave law are hostile in character, subversive of the Constitution and revolutionary in their effect.
>
> 6. That the Democracy of the United States recognize it as the imperative duty of this government to protect the naturalized citizens in all their rights, whether at home or in foreign lands, to the same extent as its native-born citizens.
>
> Whereas, One of the greatest necessities of the age, in a political, commercial, postal, and military point of view, is a speedy communication between the Pacific and Atlantic coasts; therefore be it
>
> Resolved, That the Democratic party do hereby pledge themselves to use every means in their power to secure the passage of some bill to the extent of the constitutional authority of Congress, for the construction of a Pacific railroad, from the Mississippi River to the Pacific Ocean, at the earliest practicable moment.

It will be seen that both conventions reaffirmed the Cincinnati platform of 1856. It will also be noticed that the only difference between the platforms grew out of the slavery question, the Douglas platform leaving the question to the Supreme Court, promising to abide by its decision; the Breckinridge platform declaring that the people of a Territory had the right to decide the slavery question for themselves, and also declaring that the citizens of the various States had the right to settle in a Territory and carry their property with them (meaning slaves) without being interfered with by congressional action.

The election of 1860 resulted in a victory for the Republican party, whose candidates, Abraham Lincoln and Hannibal Hamlin, ran upon a platform denouncing “threats of disunion,” and saying that “the new dogma, that the Constitution, of its own force, carries slavery into any or all of the Territories of the United States,” was a “dangerous political heresy.” The platform did not call for the abolition of slavery in the States where it existed, but asserted “that the normal condition of all the territory of the United States is that of freedom; that as our Republican fathers, when they had abolished slavery in all our national territory, ordained that ‘no person shall be deprived of life, liberty or property, without due process of law,’ it becomes our duty by legislation, whenever such legislation is necessary, to maintain this provision of the Constitution against all attempts to violate it; and we deny the authority of Congress, of a territorial legislature, or any individuals, to give legal existence to slavery in any Territory of the United States.”

Lincoln received a popular plurality of nearly 500,000 and a plurality of 108 in the Electoral College. Douglas came second in the popular vote, but fell behind both the Breckinridge ticket and Bell and Everett ticket in the Electoral College. This was due to the fact that the Douglas vote was large in the States which Lincoln carried.

In the war between the States the supporters of Douglas enlisted side by side with the supporters of Lincoln, Douglas himself having urged the support of Lincoln in the war for the maintenance of the Union. During the war, however, many things were done which aroused criticism from the Democratic leaders, and by the Democrats generally. Among the things complained of were arrests and courts-martial in States not in insurrection and where the civil authority was undisturbed.

The Democratic platform of 1864 announced “unswerving fidelity to the Union under the Constitution, as the only solid foundation of our strength, security and happiness as a people, and as a framework of government equally conducive to the welfare and prosperity of all the States, both Northern and Southern;” and then declared

> as the sense of the American people, that after four years of failure to restore the Union by the experiment of war, during which, under the pretense of a military necessity of a war power higher than the Constitution, the Constitution itself has been disregarded in every part and public liberty and private right alike trodden down, and the material prosperity of the country essentially impaired, justice, humanity, liberty, and the public welfare demand that immediate efforts be made for a cessation of hostilities, with a view to an ultimate convention of all the States, or other peaceable means, to the end that, at the earliest practicable moment, peace may be restored on the basis of the Federal union of all the States.

Gen. George B. McClellan of New Jersey was nominated by the Democratic party for President and George H. Pendleton of Ohio for Vice-President. The election resulted in a popular majority of 408,000 for the Republican ticket and in an electoral majority of 191 — Kentucky, New Jersey and Delaware being the only three of the 24 States giving their electoral vote to the Democratic ticket. It will be seen that the Republican plurality was less than it was in 1860.

The assassination of Abraham Lincoln and the inauguration of Vice-President Andrew Johnson (q.v.) as President precipitated a struggle in which most of the Republican senators and members of Congress were arrayed against the President. The Democrats took the side of the President, and with the aid of a few Republicans prevented the adoption of the articles of impeachment presented by the House.

During the reconstruction period that followed, the Democrats insisted that the States which were held in the Union should be given the rights and privileges of other States.

The campaign of 1868 was fought under the leadership of Horatio Seymour of New York and Francis P. Blair of Missouri, and the platform demanded:

> 1. Immediate restoration of all the States to their rights in the Union under the Constitution, and of civil government to the American people.
>
> 2. Amnesty for all past political offenses, and the regulation of the elective franchise in the States by their citizens.
>
> 3. Payment of all the public debt of the United States as rapidly as practicable — all money drawn from the people by taxation, except so much as is requisite for the necessities of the government, economically administered, being honestly applied to such payment; and when the obligations of the government do not expressly state upon their face, or the law under which they were issued does not provide that they shall be paid in coin, they ought, in right and justice, to be paid in the lawful money of the United States.
>
> 4. Equal taxation of every species of property according to its real value, including government bonds and other public securities.
>
> 5. One currency for the government and the people, the laborer and the office-holder, the pensioner, and the soldier, the producer and the bondholder.
>
> 6. Economy in the administration of the government; the reduction of the standing army and navy; the abolition of the Freedman's Bureau and all political instrumentalities designed to secure negro supremacy; simplification of the system and discontinuance of inquisitorial modes of assessing and collecting internal revenue; that the burden of taxation may be equalized and lessened, and the credit of the government and the currency made good; the repeal of all enactments for enrolling the State militia into national forces in time of peace; and a tariff for revenue upon foreign imports, and such equal taxation under the internal-revenue laws as will afford incidental protection to domestic manufactures, and as will, without impairing the revenue, impose the least burden upon, and best promote and encourage the great industrial interests of the country.
>
> 7. Reform of abuses in the administration; the expulsion of corrupt men from office; the abrogation of useless offices and the restoration of rightful authority to, and the independence of, the executive and judicial departments of the government; the subordination of the military to the civil power, to the end that the usurpations of Congress and the despotism of the sword may cease.
>
> 8. Equal rights and protection for naturalized and native-born citizens, at home and abroad; the assertion of American nationality which shall command the respect of foreign powers, and furnish an example and encouragement to people struggling for national integrity, constitutional liberty, and individual rights; and the maintenance of the rights of naturalized citizens against the absolute doctrine of immutable allegiance and the claims of foreign powers to punish them for alleged crimes committed beyond their jurisdiction.

Besides this statement of the position of the parties the platform arraigned the Republican party for its reconstruction policy, charging that instead of restoring the Union it had “so far as was in its power dissolved it and subjected 10 States in time of profound peace to military despotism and negro supremacy," and that it had "nullified the right of trial by jury, abolished the right of *habeas corpus* and overthrown the freedom of speech and press." The Republicans nominated General Grant and Schuyler Colfax and secured a popular plurality of about 300,000 (less than the plurality of 1864) and an electoral majority of 134.

In May 1872 a convention known as the Liberal Republican Convention was held at Cincinnati, Ohio, and nominated Horace Greeley of New York for President and Benjamin Gratz Brown of Missouri for Vice-President. The platform demanded the recognition of the doctrines of equality of all men before the law, and pledged the party's support to Articles 13, 14 and 15 of our amended national Constitution. It favored the sacred maintenance of the public credit, opposed repudiation and insisted upon the return to specie payments.

The Democrats met on 9 July at Baltimore and nominated the same ticket and adopted a platform substantially like the one adopted by the Liberal Republicans.

Those members of the Democratic party describing themselves as "straight-out" Democrats met 3 September following and nominated Charles O'Connor of New York for President and John Quincy Adams of Massachusetts for Vice-President; although both declined, nearly 30,000 votes were cast for the head of the ticket. The platform declared that the Baltimore convention had betrayed the party into a false creed and false leadership, and proclaimed that the members of the "straight-out" Democratic party preferred principle to power, and would not surrender those principles in exchange for offices which Presidents confer. The election resulted in an overwhelming victory for the Republican ticket, Grant and Wilson receiving 286 electoral votes out of 349 and a popular plurality of more than 750,000.

The nomination of Horace Greeley brought to his party a large number of influential Republicans and alienated many Democrats, yet the party's vote was only about 125,000 more than the Democratic vote of 1868, while the Republican vote of 1872 was nearly 600,000 greater than the vote of four years before.

The Democrats entered the campaign of 1876 with courage and confidence. The discovery of corruption in several of the departments and the conviction of officials high in authority, together with the panic of 1873, had broken the prestige of the Republican party and caused a wide-spread demand for reform. The Democratic party took advantage of the situation and nominated as its candidates Samuel J. Tilden of New York, who had become conspicuous in reform in his State, and Thomas A. Hendricks of Indiana, who represented all that was highest, purest and best in Democratic principle and purpose. The platform described the abuses of power and demanded reform in every department. Among other things it demanded reform in the tariff and condemned the resumption clause of 1875.

The campaign resulted in a popular plurality of 250,000 for Tilden and Hendricks. The result, however, was disputed and charges of fraud were made in the election of several States. The situation grew so serious that Congress created an electoral commission, to which the whole matter was referred. This commission was composed of five senators selected by that body, five members of Congress selected by that body, and the five senior members of the Supreme Court. See ELECTORAL COMMISSION.

The Senate being Republican selected three Republicans and two Democrats; the House being Democratic selected three Democrats and two Republicans, and of the judges three were Republicans and two Democrats. The Electoral Commission thus contained eight Republicans and seven Democrats and on every contested question the vote stood eight to seven, each member casting his vote so that it would aid his party.

The Democrats of 1880 endorsed the principles embodied in the platform of 1876, protested against centralization as dangerous to the government and denounced the "great fraud of 1876 and 1877 by which upon a false count of the electoral votes of two States the candidate defeated at the polls was declared to be President, and for the first time in American history the will of the people was set aside under a threat of military violence." The righting of the wrong of 1876 was declared to be the paramount issue. Gen. Winfield Scott Hancock, the Democratic nominee, weakened his campaign by putting the tariff question aside as "a local issue." He was defeated, however, by a popular vote of less than 10,000 and by only 59 votes in the Electoral College.

In 1884 the Democrats met at Chicago and nominated Grover Cleveland of New York for President and Thomas A. Hendricks of Indiana for Vice-President. A platform of great length was adopted, the tariff question being the one discussed at great length. The platform contained the following plank on the money question: "We believe in honest money, the gold and silver coinage of the Constitution, and a circulating medium convertible into such money without loss." This platform also contained a plank reaffirming that portion of the Democratic platform of 1856 which endorsed the liberal principles of Jefferson.

The Republican ticket, headed by James G. Blaine and John A. Logan, received a plurality of a little more than 20,000 in the popular vote, but Mr. Cleveland had 37 majority in the Electoral College.

The Democratic platform of 1888 reaffirmed the platform adopted in 1884 and endorsed the President's views on the tariff question as expressed in the tariff message which he sent to Congress in December 1887. The tariff question was made the paramount issue and the campaign waged on this question, and resulted in the election of the Republican ticket and its candidates, Benjamin Harrison and Levi P. Morton, that ticket having a majority of 65 in the Electoral College, although the Democratic ticket had a popular plurality of about 100,000.

During the Cleveland administration an attempt was made to reduce the tariff and the Mills Bill received the support of the Democratic members of the Senate and House. The Republicans, however, took advantage of the Republican victory of 1888 to propose and enact a high tariff law, known as the McKinley Act, taking its name from the chairman of the Ways and Means Committee of the House. The passage of this law was followed by an increase in prices of commodities and it became the paramount issue in the following campaign of 1892. The Democratic party that year nominated Grover Cleveland for a third time and named Adlai E. Stevenson of Illinois as his running mate.

There was a fight in the convention over the tariff plank, and as finally adopted it declared that the Federal government had no constitutional power to impose and collect tariff duties except for revenue only. The trusts were denounced and the party pledged to the enactment of laws made to prevent and control them.

The money plank of the platform was as follows:

> We denounce the Republican legislation known as the Sherman Act of 1890 as a cowardly makeshift, fraught with possibilities of danger in the future which should make all of its supporters, as well as its author, anxious for its speedy repeal. We hold to the use of both gold and silver as the standard money of the country, and to the coinage of both gold and silver without discrimination against either metal or charge for mintage, but the dollar unit of coinage of both metals must be of equal intrinsic and exchangeable value or be adjusted through international agreement, or by such safeguards of legislation as shall ensure the maintenance of the parity of the two metals, and the equal power of every dollar at all times in the markets and in the payments of debts; and we demand that all paper currency shall be kept at par with and redeemable in such coin. We insist upon this policy as especially necessary for the protection of the farmers and laboring classes, the first and most defenseless victims of unstable money and a fluctuating currency.

President Harrison was renominated by the Republicans and Whitelaw Reid was placed upon the ticket with him. In the election the Democratic ticket polled a plurality of 132 in the Electoral College and a popular plurality of about 380,000. The People's Party nominated James B. Weaver of Iowa for President and James G. Field of Virginia for Vice-President and polled a little more than 1,000,000 votes.

During President Cleveland's second term two questions occupied public attention — the money question and the tariff question. Congress was called together in extraordinary session in August 1893 and the President recommended the unconditional repeal of the Sherman Law. By reference to the Democratic platform of 1892 it will be seen that the money plank contained a statement of the party's faith in the double standard as well as its desire for the repeal of the Sherman Act, and an effort to repeal the makeshift without restoring the double standard caused a division in the ranks of the party; but the President succeeded in securing the legislation which he desired. Doing this, however, he had the support of a larger percentage of the Republican senators and members than he had of the Democrats.

Congressman Wilson, chairman of the Ways and Means Committee, reported a measure which bears his name and the bill as it passed the House was satisfactory to the friends of tariff reform; but it was emasculated by the Senate, where a coterie of Democratic senators refused to support it until the rates of several schedules were raised. The President refused to sign the bill, but allowed it to become a law without his signature. The bill contained an income tax, but this clause was declared unconstitutional by the Supreme Court, the vote standing five to four. The decision was rendered at the second hearing. At the first hearing the vote stood four to four, and as the ninth judge who was not present until the second hearing favored the tax it required the change of opinion on the part of one of the judges to render the income tax inoperative.

After the passage of the tariff law the currency question again occupied the attention of Congress and became the paramount issue in the campaign of 1896. The money issue was fought out in the party and the delegates to the Chicago convention were instructed to carry out the financial policy endorsed by the members of the State convention selecting them, who in turn had been instructed by county conventions. As a result of this inter-party contest the advocates of bimetallism won a decisive victory, having more than two-thirds of the national delegates.

The following platform was adopted:

> We, the Democrats of the United States in National Convention assembled, do reaffirm our allegiance to those great essential principles of justice and liberty, upon which our institutions are founded, and which the Democratic party has advocated from Jefferson's time to our own — freedom of speech, freedom of press, freedom of conscience, the preservation of personal rights, the equality of all citizens before the law, and the faithful observance of constitutional limitations.
>
> During all these years the Democratic party has resisted the tendency of selfish interests to the centralization of governmental power, and steadfastly maintained the integrity of the dual scheme of government established by the founders of this Republic of republics. Under its guidings and teachings the great principle of local self-government has found its best expression in the maintenance of the rights of the States and in its assertion of the necessity of confining the general government to the exercise of the powers granted by the Constitution of the United States.
>
> The Constitution of the United States guarantees to every citizen the rights of civil and religious liberty. The Democratic party has always been the exponent of political liberty and religious freedom, and it renews its obligations and reaffirms its devotions to these fundamental principles of the Constitution.
>
> Recognizing that the money question is paramount to all others at this time, we invite attention to the fact that the Federal Constitution named silver and gold together as the money metals of the United States, and that the first coinage law passed by Congress under the Constitution made the silver dollar the monetary unit and admitted gold to free coinage at a ratio based upon the silver-dollar unit.
>
> We declare that the act of 1873 demonetizing silver without the knowledge or approval of the American people has resulted in the appreciation of gold and a corresponding fall in the prices of commodities produced by the people; a heavy increase in the burden of taxation and of all debts, public and private; the enrichment of the money-lending class at home and abroad; the prostration of industry and impoverishment of the people.
>
> We are unalterably opposed to monometallism, which has locked fast the prosperity of an industrial people in the paralysis of hard times. Gold monometallism is a British policy, and its adoption has brought other nations into financial servitude to London. It is not only un-American, but anti-American, and it can be fastened on the United States only by the stifling of that spirit and love of liberty which proclaimed our political independence in 1776 and won it in the War of the Revolution.
>
> We demand the free and unlimited coinage of both silver and gold at the present legal ratio of 16 to 1 without waiting for the aid or consent of any other nation. We demand that the standard silver dollar shall be a full legal tender, equally with gold, for all debts, public and private, and we favor such legislation as will prevent for the future the demonetization of any kind of legal-tender money by private contract.
>
> We are opposed to the policy and practice of surrendering to the holders of the obligations of the United States the option reserved by law to the government of redeeming such obligations in either silver coin or gold coin.
>
> We are opposed to the issuing of interest-bearing bonds of the United States in time of peace and condemn the trafficking with banking syndicates, which, in exchange for bonds and at an enormous profit to themselves, supply the Federal treasury with gold to maintain the policy of gold monometallism.

Congress alone has the power to coin and issue money, and President Jackson declared that this power could not be delegated to corporations or individuals. We, therefore, denounce the issuance of notes intended to circulate as money by national banks as in derogation of the Constitution, and we demand that all paper which is made a legal tender for public and private debts, or which is receivable for dues to the United States, shall be issued by the government of the United States and shall be redeemable in coin.

We hold that tariff duties shall be levied for purposes of revenue, such duties to be so adjusted as to operate equally throughout the country, and not discriminate between class or section, and that taxation should be limited by the needs of the government, honestly and economically administered. We denounce as disturbing to business the Republican threat to restore the McKinley law, which has twice been condemned by the people in national elections, and which, enacted under the false plea of protection to home industry, proved a prolific breeder of trusts and monopolies, enriched the few at the expense of the many, restricted trade and deprived the producers of the great American staples of access to their natural markets.

Until the money question is settled we are opposed to any agitation for further changes in our tariff laws, except such as are necessary to meet the deficit in revenue caused by the adverse decision of the Supreme Court on the income tax. But for this decision by the Supreme Court there would be no deficit in the revenue under the law passed by a Democratic Congress in strict pursuance of the uniform decisions of that court for nearly 100 years, that court having in that decision sustained constitutional objections to its enactment which had previously been overruled by the ablest judges who have ever sat on that bench. We declare that it is the duty of Congress to use all the constitutional power which remains after that decision, or which may come from its reversal by the court as it may hereafter be constituted, so that the burdens of taxation may be equally and impartially laid, to the end that wealth may bear its due proportion of the expense of the government.

We hold that the most efficient way of protecting American labor is to prevent the importation of foreign pauper labor to compete with it in the home market, and that the value of the home market to our American farmers and artisans is greatly reduced by a vicious monetary system which depresses the prices of their products below the cost of production, and thus deprives them of the means of purchasing the products of our home manufactories; and as labor creates the wealth of the country, we demand the passage of such laws as may be necessary to protect it in all its rights.

We are in favor of the arbitration of differences between employers engaged in interstate commerce and their employees, and recommend such legislation as is necessary to carry out this principle.

The absorption of wealth by the few, the consolidation of our leading railroad systems, and the formation of trusts and pools require a stricter control by the Federal government of those arteries of commerce. We demand the enlargement of the power of the Interstate Commerce Commission and such restriction and guarantees in the control of railroads as will protect the people from robbery and oppression.

We denounce the profligate waste of the money wrung from the people by oppressive taxation and the lavish appropriations of recent Republican congresses, which have kept taxes high, while the labor that pays them is unemployed and the products of the people's toil are depressed in price till they no longer repay the cost of production. We demand a return to that simplicity and economy which befits a Democratic government and a reduction in the number of useless offices the salaries of which drain the substance of the people.

We denounce arbitrary interference by Federal authorities in local affairs as a violation of the Constitution of the United States and a crime against free institutions, and we especially object to government by injunction as a new and highly dangerous form of oppression by which the Federal judges, in contempt of the laws of the States and rights of citizens, become at once legislators, judges, executioners; and we approve the bill passed at the last session of the United States Senate, and now pending in the House of Representatives, relative to contempts in Federal courts and providing for trials by jury in certain cases of contempt.

No discrimination should be indulged in by the government of the United States in favor of any of its debtors. We approve of the refusal of the Fifty-third Congress to pass the Pacific Railroad Funding Bill and denounce the effort of the present Republican Congress to enact a similar measure.

Recognizing the just claims of deserving Union soldiers, we heartily endorse the rule of the present commissioner of pensions, that no names shall be arbitrarily dropped from the pension roll; and the fact of enlistment and service should be deemed conclusive evidence against disease and disability before enlistment.

We favor the admission of the Territories of New Mexico Arizona, and Oklahoma into the Union as States, and we favor the early admission of all the Territories having the necessary population and resources to entitle them to Statehood, and, while they remain Territories, we hold that the officials appointed to administer the government of any Territory, together with the District of Columbia and Alaska, should be *bona fide* residents of the Territory or District in which their duties are to be performed. The Democratic party believes in home rule and that all public lands of the United States should be appropriated to the establishment of free homes for American citizens.

We recommend that the Territory of Alaska be granted a delegate in Congress and that the general land and timber laws of the United States be extended to said Territory.

The Monroe Doctrine, as originally declared, and as interpreted by succeeding Presidents, is a permanent part of the foreign policy of the United States and must at all times be maintained.

We extend our sympathy to the people of Cuba in their heroic struggle for liberty and independence.

We are opposed to life tenure in the public service, except as provided in the Constitution. We favor appointments based on merit, fixed terms of office, and such an administration of the civil-service laws as will afford equal opportunities to all citizens of ascertained fitness.

We declare it to be the unwritten law of this Republic, established by custom and usage of one hundred years and sanctioned by the examples of the greatest and wisest of those who founded and have maintained our government, that no man should be eligible for a third term of the Presidential office.

The Federal government should care for and improve the Mississippi River and other great waterways of the Republic, so as to secure for the interior States easy and cheap transportation to tide water. When any waterway of the Republic is of sufficient importance to demand aid of the government, such aid should be extended upon a definite plan of continuous work until permanent improvement is secured.

Confiding in the justice of our cause and the necessity of its success at the polls, we submit the foregoing declaration of principles and purposes to the considerate judgment of the American people. We invite the support of all citizens who approve them and who desire to have them made effective through legislation, for the relief of the people and the restoration of the country's prosperity.

The minority, led by Senator Hill of New York, submitted the following, which was rejected by the convention:

To the Democratic National Convention: 16 delegates, constituting the minority of the Committee on Resolutions, find many declarations in the report of the majority to which they cannot give their assent. Some of these are wholly unnecessary. Some are ill considered and ambiguously phrased, while others are extreme and revolutionary of the well-recognized principles of the party. The minority content themselves with this general expression of their dissent, without going into a specific statement of the objectionable features of the report of the majority; but upon the financial question, which engages at this time the chief share of public attention, the views of the majority differ so fundamentally from what the minority regard as vital Democratic doctrine as to demand a distinct statement of what they hold to as the only just and true expression of Democratic faith upon the paramount issue, as follows, which is offered as a substitute for the financial plank in the majority report:

"We declare our belief that the experiment on the part of the United States alone of free silver coinage and a change of the existing standard of value independently of the action of other great nations, would not only imperil our finances, but would retard or entirely prevent the establishment of international bimetallism, to which the efforts of the government should be steadily directed. It would place this country at once upon a silver basis, impair contracts, disturb business, diminish the purchasing power of the wages of labor, and inflict irreparable evils upon our nation's commerce and industry.

"Until international co-operation among leading nations for the coinage of silver can be secured we favor the rigid maintenance of the existing gold standard as essential to the preservation of our national credit, the redemption of our public pledges, and the keeping inviolate of our country's honor. We insist that all our paper and silver currency shall be kept absolutely at a parity with gold. The Democratic party is the party of hard money and is opposed to legal tender paper money as a part of our permanent financial system, and we therefore favor the gradual retirement and cancellation of all United States notes and Treasury notes, under such legislative provisions as will prevent undue contraction. We demand that the national credit shall be resolutely maintained at all times and under all circumstances."

The minority also feel that the report of the majority is defective in failing to make any recognition of the honesty, economy, courage and fidelity of the present Democratic administration. And they therefore offer the following declaration as an amendment to the majority report: "We commend the honesty, economy, courage and fidelity of the present Democratic National Administration."

The main resolutions submitted by the minority were rejected by more than a two-thirds vote and the platform as reported by the committee was adopted by the same vote. The resolution endorsing the administration was defeated by a little less than two-thirds.

The convention named as its candidates William Jennings Bryan of Nebraska and Arthur Sewall of Maine. The "National" Democrats met at Indianapolis in September following, issued a platform endorsing the gold standard and named John M. Palmer and Simon B. Buckner as their national ticket. William McKinley of Ohio and Garret A. Hobart of New Jersey were the nominees of the Republican convention. The platform contained a plank favoring a protective tariff and a plank opposing free coinage until foreign co-operation could be secured — but pledging the party to promote international bimetallism.

The People's party, generally known as the Populist party, met at Saint Louis and adopted a platform containing the same silver plank as the Democratic platform and endorsed and nominated the Democratic candidate for President. Instead of endorsing Mr. Sewall for the Vice-Presidency, the convention named Thomas E. Watson of Georgia for that office. The Silver Republicans met at the same time, endorsed the Democratic ticket and adopted a silver plank identical with the Democratic plank.

The campaign aroused deep feeling on both sides and was warmly contested in the Central States. It became apparent early in the campaign that the Democratic ticket would carry the Western and Southern States and that the Republican ticket would sweep the Eastern States. A very large vote was polled, the total that year being nearly 2,000,000 in excess of the total vote of four years before. The Republican party secured a popular plurality of 601,854. The electoral vote stood: McKinley and Hobart, 271; Bryan and Sewall, 176.

Between 1896 and 1900 there was an improvement in industrial conditions, an increase in the volume of money and a series of wars throughout the world. In 1898 the United States interfered in behalf of the Cubans and became involved in a war with Spain, which war resulted in Cuban independence; but during the war a naval victory in the Philippines put this nation in temporary control of those islands and resulted in our possession of them as an indemnity for the expenses incurred in behalf of the Cubans. The cession of the Philippine Islands to the United States raised a question which has not yet been settled. The sentiment is at present divided, the Democrats favoring the immediate promise that independence will be given as soon as a stable government is established, this independence to be accompanied by protection from outside interference. Some of the Republicans desire that the Philippine Islands be held under a colonial system and others desire that the islands be given a territorial form of government with a view to ultimate statehood.

The Democratic convention which met at Kansas City, 4 July 1900, endorsed the Declaration of Independence and adopted the following platform:

> We, the representatives of the Democratic party of the United States, assembled in national convention on the anniversary of the adoption of the Declaration of Independence, do reaffirm our faith in that immortal proclamation of the inalienable rights of man and our allegiance to the Constitution framed in harmony therewith by the fathers of the Republic. We hold with the United States Supreme Court that the Declaration of Independence is the spirit of our government, of which the Constitution is the form and letter.
>
> We declare again that all governments instituted among men derive their just powers from the consent of the governed; that any government not based upon the consent of the governed is tyranny, and that to impose upon any people a government of force is to substitute the methods of imperialism for those of a republic. We hold that the Constitution follows the flag, and denounce the doctrine that an Executive or Congress, deriving their existence and their powers from the Constitution, can exercise lawful authority beyond it or in violation of it.
>
> We assert that no nation can long endure half republic and half empire, and we warn the American people that imperialism abroad will lead quickly and inevitably to despotism at home.
>
> Believing in these fundamental principles, we denounce the Porto Rican law, enacted by a Republican Congress against the protest and opposition of the Democratic minority, as a bold and open violation of the nation's organic law and a flagrant breach of the national good faith. It imposes upon the people of Porto Rico a government without their consent and taxation without representation. It dishonors the American people by repudiating a solemn pledge made in their behalf by the commanding general of our army, which the Porto Ricans welcomed to a peaceful and unresisted occupation of their land. It doomed to poverty and distress a people whose helplessness appeals with peculiar force to our justice and magnanimity.
>
> In this, the first act of its imperialistic programme, the Republican party seeks to commit the United States to a colonial policy inconsistent with republican institutions and condemned by the Supreme Court in numerous decisions.
>
> We condemn and denounce the Philippine policy of the present administration. It has involved the public in unnecessary war, sacrificed the lives of many of our noblest sons and placed the United States, previously known and applauded throughout the world as the champion of freedom, in the false and un-American position of crushing with military force the efforts of our former allies to achieve liberty and self-government. The Filipinos cannot be citizens without endangering our civilization; they cannot be subjects without imperilling our form of government, and as we are not willing to surrender our civilization or to convert the republic into an empire, we favor an immediate declaration of the nation's purpose to give the Filipinos, first, a stable form of government; second, independence; and, third, protection from outside interference, such as has been given for nearly a century to the republics of Central and South America.
>
> We are not opposed to territorial expansion when it takes in desirable territory which can be erected into States in the Union and whose people are willing and fit to become American citizens. We favor expansion by every peaceful and legitimate means. But we are unalterably opposed to seizing or purchasing distant islands to be governed outside the Constitution and whose people can never become citizens.
>
> We are in favor of extending the Republic's influence among the nations, but believe that influence should be extended, not by force and violence, but through the persuasive power of a high and honorable example. The importance of other questions now pending before the American people is no wise diminished, and the Democratic party takes no backward step from its position on them, but the burning issue of imperialism growing out of the Spanish war involves the very existence of the republic and the destruction of our free institutions. We regard it as the paramount issue of the campaign.
>
> The declaration in the Republican platform adopted at the Philadelphia convention, held in June 1900, that the Republican party "steadfastly adheres to the policy announced in the Monroe Doctrine," is manifestly deceptive. This profession is contradicted by the avowed policy of that party, in opposition to the spirit of the Monroe Doctrine, to acquire and hold sovereignty over large areas of territory and large numbers of people in the eastern hemisphere. We insist on the strict maintenance of the Monroe Doctrine in all its integrity, both in letter and in spirit, as necessary to prevent the extension of European authority on this continent and as essential to our supremacy in American affairs. At the same time we declare that no American people shall ever be held by force in unwilling subjection to European authority.
>
> We oppose militarism. It means conquest abroad and intimidation and oppression at home. It means the strong arm which has ever been fatal to free institutions. It is what millions of our citizens have fled from in Europe. It will impose upon our peace-loving people a large standing army and unnecessary burden of taxation, and will be a constant menace to their liberties. A small standing army

> and a well-disciplined State militia are amply sufficient in time of peace. This republic has no place for a vast military service and conscription.
>
> In time of danger the volunteer soldier is his country's best defender. The National Guard of the United States should ever be cherished in the patriotic hearts of a free people. Such organizations are ever an element of strength and safety. For the first time in our history and coeval with the Philippine conquest has there been a wholesale departure from our time-honored and approved system of volunteer organization. We denounce it as un-American, un-Democratic and un-Republican and as a subversion of the ancient and fixed principles of a free people.
>
> Private monopolies are indefensible and intolerable. They destroy competition, control the price of all material and of the finished product, thus robbing both producer and consumer. They lessen the employment of labor, and arbitrarily fix the terms and conditions thereof, and deprive individual energy and small capital of their opportunity for betterment. They are the most efficient means yet devised for appropriating the fruits of industry to the benefit of the few at the expense of the many, and unless their insatiate greed is checked all wealth will be aggregated in a few hands and the republic destroyed.
>
> The dishonest paltering with the trust evil by the Republican party in State and national platforms is conclusive proof of the truth of the charge that trusts are the legitimate product of Republican policies, that they are fostered by Republican laws, and that they are protected by the Republican administration in return for campaign subscriptions and political support.
>
> We pledge the Democratic party to an unceasing warfare in nation, State and city against private monopoly in every form. Existing laws against trusts must be enforced, and more stringent ones must be enacted providing for publicity as to the affairs of corporations engaged in interstate commerce, requiring all corporations to show, before doing business outside the State of their origin, that they have no water in their stock, and that they have not attempted, and are not attempting, to monopolize any branch of business or the production of any articles of merchandise, and the whole constitutional power of Congress over interstate commerce, the mails and all modes of interstate communication shall be exercised by the enactment of comprehensive laws upon the subject of trusts.
>
> Tariff laws should be amended by putting the products of trusts upon the free list, to prevent monopoly under the plea of protection.
>
> The failure of the present Republican administration, with an absolute control over all the branches of the national government, to enact any legislation designed to prevent or even curtail the absorbing power of trusts and illegal combinations, or to enforce the anti-trust laws already on the statute books, proves the insincerity of the high-sounding phrases of the Republican platform.
>
> Corporations should be protected in all their rights, and their legitimate interests should be respected, but any attempt by corporations to interfere with public affairs of the people or to control the sovereignty which creates them should be forbidden under such penalties as will make such attempts impossible.
>
> We condemn the Dingley tariff law as a trust-breeding measure, skilfully devised to give the few favors which they do not deserve and to place upon the many burdens which they should not bear.
>
> We favor such an enlargement of the scope of the interstate commerce law as will enable the commission to protect individuals and communities from discriminations and the public from unjust and unfair transportation rates.

It will be seen that the question of imperialism was made the paramount issue, the trust question coming next in the amount of attention given to it. The convention, however, reaffirmed the principles embodied in the Chicago platform, and reiterated the position taken four years before on the money question and on several other questions.

Mr. Bryan was renominated and Adlai E. Stevenson of Illinois was placed upon the ticket as the candidate for Vice-President. This ticket was endorsed later by the People's Party convention, and by the Silver Republican convention, both of which parties adopted platforms in line with the Democratic platform upon the leading issues. The Democratic ticket was also endorsed by the Anti-imperalists.

While the Democrats tried to focus public attention upon the menace of imperialism, the Republicans said: «Let well enough alone,» and credited the improved conditions of the people in part to the gold standard and in part to the high-tariff law enacted in 1898. They protested against any change in the financial laws or the tariff law, and denied that they intended any departure from the principles of free government.

The Republican ticket, headed by President McKinley and Theodore Roosevelt of New York, was again successful, the popular plurality being 849,455. The electoral vote stood, McKinley and Roosevelt 292; Bryan and Stevenson 155. The campaign of 1900 did not excite as much interest as the preceding campaign. In 1904 Alton B. Parker of New York was nominated for President, with Henry G. Davis of West Virginia for Vice-President. In this election the party practically reversed its previous position on the money question. The Republican party, with a ticket headed by President Roosevelt, was again successful, the electoral vote standing 336 to 140.

While Roosevelt's popular vote and popular majority were the largest ever recorded for any President up to that time, it is remarkable, and indicative of the increasing independence of the voters, that five States which gave Roosevelt large majorities elected Democratic governors: Massachusetts, Minnesota, Missouri, Colorado, and Montana. The same zeal for thoroughgoing reform and an appreciation of the personal character of candidates has greatly affected State and municipal elections, resulting in the overthrow of bosses and machines and a permanent elevation of popular political standards for parties and for administration.

The principal declarations in the platform of the Democratic party, adopted at Saint Louis, Mo., 8 July 1904, were:

> In favor of laws giving labor and capital impartially their just rights; trial by jury in cases of indirect contempts in Federal Courts; liberal appropriations for the improvement of waterways; economy of administration, without impairing efficiency of any branch of the government; and the enforcement of honesty in public service;
>
> Condemning the action of the Republican party in Congress in refusing to prohibit an executive department from entering into contracts with convicted trusts or unlawful combinations in restraint of interstate trade, and in favor of "Jeffersonian simplicity of living" on the part of public officials; against "executive usurpation of legislative and judicial functions" by the President; preservation of "an open door for the world's commerce in the Orient without any unnecessary entanglement in Oriental and European affairs, and without arbitrary, unlimited, irresponsible and absolute government anywhere within our jurisdiction," against "an indefinite, irresponsible, discretionary and vague absolutism and a policy of colonial exploitation"; and against making one set of laws for those "at home" and a different set of laws for those "in the colonies";
>
> Against tariff legislation that "robs the many to enrich the few," and in favor of a tariff limited to the needs of the Government, economically administered, and so levied as not to discriminate against any industry, class or section; a gradual reduction of the tariff; against private monopoly, and in favor of individual equality of opportunity and free competition; against rebates and discrimination by transportation companies; and in favor of an enlargement of the powers of the Interstate Commerce Commission, reclamation of arid lands in the West, no land monopoly, the speedy construction of the Panama Canal, and the election of U. S. Senators by direct vote of the people;
>
> Condemnation of polygamy within the jurisdiction of the United States, and also of the ship subsidy bill passed by the United States Senate; and in favor of upbuilding a merchant marine, liberal trade arrangements with Canada, the maintenance of the Monroe Doctrine, a reduction of the army, generous pensions, and civil service reform.

In 1908 the Republican party nominated Secretary of War William Howard Taft, of Ohio, for President and Congressman James S. Sherman, of New York, for Vice-President, The Democratic party for the third time selected William J. Bryan as its Presidential candidate and John W. Kern, of Indiana, for Vice-President. The Socialists nominated Eugene V. Debs, of Indiana, and Ben Hanford, of New York; the Populists Thomas E. Watson, of Georgia, and Samuel W. Williams, of Indiana; and the Prohibitionists Eugene W. Chafin, of Illinois, and Aaron S. Watkins, of Ohio. This election witnessed the entry of a new party into the political arena — the Independence party, of which William R. Hearst, of New York, was the chief factor, and of which Thomas L. Hisgen, of Massachusetts, and John T. Graves, of New York (formerly of Georgia), were the candidates. The results of this election were as follows: Taft, Republican, 7,637,676; Bryan, Democrat, 6,393,182; Debs, Socialist, 448,453; Chafin, Prohibitionist, 241,252; Hisgen, Independent, 83,183; Watson, Populist, 33,871; Gillhaus, Socialist Labor, 15,421.

This election was remarkable in that nearly 1,350,000 more votes were cast than in the election of 1904. Taft received a popular vote exceeding that of Roosevelt by over 14,000; Bryan received over 1,300,000 votes more than his predecessor, Parker; and the Socialist vote increased more than 45,000. On the other hand the Prohibition vote was more than 17,000 less than that of 1904; the Populist vote was over 83,000 behind the vote of 1904; and the Socialist-Labor candidate less than 50 per cent of the vote of his predecessor. In this election the independence of the voters was again manifested as it had been in 1904, several States which gave Taft majorities electing Democratic governors, notably Indiana, Minnesota, and Ohio. Also several States that had previously been Republican in gubernatorial elections changed to the Democratic column, notably Colorado, Nebraska, and Ohio, while the usually Democratic Missouri elected a Republican governor. Oklahoma, with seven electoral votes, had been admitted as a State since the election of 1904, thus increasing the electoral vote to 483 and raising the majority necessary to a choice from 239 to 242. The electoral college gave Taft 321 votes and Bryan 162.

The principal declarations in the platform of the Democratic party, adopted at Denver, Col., 10 July 1908 were as follows:

> Against the misuse of patronage on the part of the President; in favor of a law preventing any corporation contributing to a campaign fund, and any individual contributing an amount above a reasonable minimum, and providing for the publication before election of all such contributions above a reasonable minimum; against the extension of the powers of the general government by judicial construction; in favor of additions to federal remedies for the regulation of Interstate commerce and for the prevention of private monopoly, as well as State remedies of the same kind;
>
> In favor of tariff reform by immediate revision and reduction of import duties; that articles entering into competition with trust-controlled products should be placed upon the free list, and material reductions made in the tariff upon the necessaries of life, especially upon articles competing with such American manufactures as are sold abroad more cheaply than at home, and that graduated reductions should be made in such other schedules as may be necessary to restore the tariff to a revenue basis; the immediate repeal of the tariff on pulp, print paper, lumber, timber and logs, and that these articles be placed upon the free list;
>
> Against private monopoly, as in 1904: — By first, the enactment of a law preventing a duplication of directors among competing corporations; second, a license system which will, without abridging the right of each State to create corporations or its right to regulate as it will foreign corporations doing business within its limits, make it necessary for a manufacturing or trading corporation engaged in Interstate commerce to take out a federal license before it shall be permitted to control as much as 25 per cent of the product in which it deals, a license to protect the public from watered stock and to prohibit the control by such corporations of more than 50 per cent of the total amount of any product consumed in the United States; and, third, a law compelling such licensed corporations to sell to all purchasers in all parts of the country on the same terms after making due allowance for cost of transportation;
>
> Control over Interstate commerce by Congress and by each State within its borders, the platform containing detailed recommendations in this connection as well as on the subjects: of banking and currency; an income tax; labor and injunctions; the American merchant marine; the navy; the protection of American citizens at home and abroad; civil service; pensions; the organization of a National Health Bureau; the extension of industrial education through agricultural experiment stations and secondary agricultural and mechanical colleges; the popular election of Senators; the admission of Arizona and New Mexico to statehood; free grazing upon public lands; the improvement of waterways; maintenance of post-roads; curtailment of arbitrary power on the part of the Speaker of the House; economy in administration and a reduction in the number of office holders; conservation of natural resources; the independence of the Philippine Islands; developing closer ties of Pan American friendship and commerce; regulation of rates and services of telegraph and telephone companies engaged in the transmission of interstate messages.

At the Democratic convention held at Baltimore, 25 June–2 July 1912, 46 ballots were taken, the first ballot for the four leading candidates resulting: Champ Clark, Missouri, 440½; Woodrow Wilson, New Jersey, 324; Judson Harmon, Ohio, 148; Oscar W. Underwood, Alabama, 117½; the final ballot, Woodrow Wilson, 990; Champ Clark, 84; Judson Harmon, 12; Thomas R. Marshall, Indiana, was nominated for Vice-President. The Republican party renominated as President, William Howard Taft, Ohio, and nominated as Vice-President, Nicholas Murray Butler, New York. The Progressive party nominated Theodore Roosevelt, New York, for President and Hiram W. Johnson, California, for Vice-President. Eugene V. Debs, Indiana, as President with Emil Seidl, Wisconsin, as Vice-President were nominated by the Socialist party; Eugene W. Chafin, Ariz., as President and Aaron S. Watkins, as Vice-President by the Prohibitionist party; and Arthur E. Reimer, Massachusetts, President, August Gilhaus, New York, Vice-President, by the Socialist Labor party. The results of the election were as follows: Woodrow Wilson received a plurality vote of 2,173,519; the figures being Woodrow Wilson, 6,193,019; William H. Taft, 3,484,956; Theodore Roosevelt, 4,119,507; Eugene V. Debs, 901,873; Eugene W. Chafin, 207,928; Arthur E. Reimer, 29,259. Among the chief declarations in the National platform of the Democratic party, adopted at Baltimore, Md., 2 July 1912, were those on tariff reform; currency reform; on the enforcement of the anti-trust law; on income tax and popular election of senators; on Republican extravagance through oppressive taxation; on the establishment of rural credits; a redeclaration from the platform of 1908 on the rights of labor; the conservation of national resources; on law reform; and the policy toward the Philippines. Attention was also called to the fact that

> The Democratic Party's demand for a return to the rule of the people, expressed in the National platform four years ago, has now become the accepted doctrine of a large majority of the electors. We again remind the country that only by the larger exercise of the reserved power of the people can they preserve themselves from the misuse of delegated power and the usurpation of governmental instrumentalities by special interests. For this reason the National convention insisted on the overthrow of Cannonism and the inauguration of a system by which United States senators could be elected by direct vote. The Democratic party offered itself to the country as an agency through which the complete overthrow and extirpation of corruption, fraud and machine rule in American politics can be effected.

At the Democratic National Convention held at Saint Louis, Mo., June 14–16, 1916, President Wilson and Vice-President Marshall were renominated by acclamation. The Republican party nominated Charles E. Hughes, New York, and Charles W. Fairbanks, Indiana, respectively, for President and Vice-President. The election resulted with a plurality vote of 581,941 for Wilson, the figures being Woodrow Wilson, New Jersey, Democrat, 9,129,269; Charles E. Hughes, New York, Republican, 8,547,328; Allen J. Bensen, New York, Socialist, 590,579; J. Frank Hanly, Indiana, Prohibitionist, 221,329; Arthur E. Reimer, Massachusetts, Socialist Labor, 14,180.

Endorsing the administration of Woodrow Wilson as the best exposition of sound Democratic policy ever displayed at home and abroad, the National Convention at Saint Louis, Mo., 16 June 1916, adopted a declaration which challenged a comparison of the record of the party in keeping pledges and in constructive legislation, with those of any party at any time. The achievements wrought by four years of Democratic administration were summarized, and for the further conduct of national affairs the policies to which the party committed itself included: Economic freedom to remove so far as possible every remaining element of unrest and uncertainty from the path of the business men of America; an unreserved endorsement of the Underwood tariff law as the best means for providing sufficient revenue for the economical administration and operation of the Government; the development of Americanism, summoning all men of whatever origin or creed who would count themselves American, to join in making clear to all the world the unity and consequent power of America; industrial preparedness as preparedness to maintain peace and to ensure the same respect for its rights as the nation extends to the rights of other powers; to make the honor and ideals of the United States a standard for international relations alike in negotiation and action; to continue the promotion of the Pan-American Concord, the friendly relations between the people of the Western Hemisphere; the development of the merchant marine; of agriculture and betterment of the farmer; the construction of good roads; the extension of the franchise to the women of the country by the States upon the same terms as to men; the protection and preservation of the sacred right of American citizenship at home and abroad; the modern principles of prison reform to be applied in the Federal penal system. The conclusion of the declaration summarized as follows:

> This is a critical hour in the history of America, a critical hour in the history of the world. Upon its record, which shows great constructive achievement in following out a consistent policy for our domestic and internal development, upon the word of the Democratic administration, which maintained the honor, the dignity and the interests of the United States and at the same time retained the respect and friendship of all the nations of the world, and upon the great policies for the future strengthening of the life of our country, the enlargement of our national vision and the ennobling of our international relations, we appeal with confidence to the voters of the country.

In the President's armed neutrality message delivered in a personal address to Congress 26 Feb. 1917 he said in part:

> Since it has unhappily proved impossible to safeguard our neutral rights by diplomatic means against the unwarranted infringements they are suffering at the hands of Germany, there may be no recourse but to armed neutrality, which we shall know how to maintain and for which there is abundant American precedent. It is devoutly to be hoped that it will not be necessary to put armed forces anywhere into action. The American people do not desire it, and our desire is not different from theirs. I am sure that they will understand the spirit in which I am now acting, the purpose I hold nearest my heart and would wish to exhibit in everything I do. . . . No course of my choosing or of theirs will lead to war. War can come only by the wilful acts and aggressions of others.

In the President's address to Congress, delivered at a joint session of the two Houses 2 April 1917, the reasons for entering the World War were stated as follows:

> The present German submarine warfare against commerce is a warfare against mankind. . . . It is a war against all nations. American ships have been sunk, American lives taken in ways which it has stirred us very deeply to learn of, but the ships and people of other neutral and friendly nations have been sunk and overwhelmed in the waters in the same way. There has been no discrimination. The challenge is to all mankind. Each nation must decide for itself how it will meet it. The choice we make for ourselves must be made with a moderation of counsel and a temperateness of judgment befitting our character and our motives as a nation. We must put excited feeling away. Our motive will not be revenge or the victorious assertion of the physical might of the nation, but only the vindication of right, of human right, of which we are only a single champion. . . . When I addressed the Congress on the twenty-sixth of February last I thought that it would suffice to assert our neutral rights with arms, our right to use the seas against unlawful interference, our right to keep our people safe against unlawful violence. But armed neutrality, it now appears, is impracticable. Because submarines are in effect outlaws when used as the German submarines have been used against merchant shipping, it is impossible to defend ships against their attacks as the law of nations have assumed that merchantmen would defend themselves against privateers or cruisers, visible craft giving chase upon the open sea. It is common prudence in such circumstances, grim necessity, indeed, to endeavor to destroy them before they have shown their own intention. They must be dealt with upon sight, if dealt with at all. The German Government denies the rights of neutrals to use arms at all within the areas of the sea which it has proscribed, even in the defence of rights which no modern publicist has ever before questioned their right to defend. The intimation is conveyed that the armed guards which we have placed on our merchant ships will be treated as beyond the pale of law and subject to be dealt with as pirates would be. Armed neutrality is ineffectual enough at best; in such circumstances and in the face of such pretensions it is worse than ineffectual: it is likely only to produce what it was meant to prevent; it is practically certain to draw us into the war without either the rights or the effectiveness of belligerents. There is one choice we cannot make, we are incapable of making; we will not choose the path of submission and suffer the most sacred rights of our nation and our people to be ignored or violated. The wrongs against which we now array ourselves are no common wrongs; they cut to the very roots of human life. . . . Just because we fight without rancor and without selfish object, seeking nothing for ourselves, but what we shall wish to share with all free peoples, we shall, I feel confident, conduct our operations as belligerents without passion and ourselves observe with proud punctilio the principles of right and of fair play we profess to be fighting for. . . . It is a distressing and oppressive duty, Gentlemen of the Congress, which I have performed in thus addressing you. There are, it may be, many months of fiery trial and sacrifice ahead of us. It is a fearful thing to lead this great peaceful people into war, into the most terrible and disastrous of all wars, civilization itself seeming to be in the balance. But the right is more precious than peace, and we shall fight for the things which we have always carried nearest our hearts — for democracy, for the right of those who submit to authority to have a voice in their own governments, for the rights and liberties of small nations, for a universal dominion of right by such a concert of free peoples as shall bring peace and safety to all nations and make the world itself at last free. To such a task we can dedicate our lives and our fortunes, everything that we are and everything that we have, with the pride of those who know that the day has come when America is privileged to spend her blood and her might for the principles that gave her birth and happiness and the peace which she has treasured. God helping her, she can do no other" . . .

The work of the administration is briefly summarized in a survey of the principal acts passed by the 65th Congress making provision to prosecute the war. On 2 April the German war resolution was introduced in the House, and four days after the assembling of Congress, on 6 April, the President affixed his signature to the measure. A general deficiency appropriation act was passed amounting to $163,841,400.52, of which $100,000,000 was for national security and defense. The first issue of liberty bonds was authorized to meet expenses for national security and defense, to aid allied governments and for other purpose. The act appropriated $3,007,063,945.46 for establishing credits in the United States for foreign governments by purchase of bonds of our Allies, and expenses incident to preparation and issue of bonds and certificates; it authorized the issue of bonds amounting to $5,063,945,460, of which $3,000,000,000 were to meet the loans authorized to foreign governments; $2,000,000,000 to meet domestic expenditures; and $63,945,460 to redeem the 3 per cent loan of 1908 to 1918, maturing 1 Aug. 1918; it also authorized $2,000,000,000 of one-year certificates of indebtedness temporarily to provide revenue. Other acts appropriated $273,046,322.50 for the support of the army for the fiscal year 1918; $1,344,896.18 for the support of the Military Academy during 1918; $3,281,094,541.60 for the military and naval establishments on account of war expenses, including $405,000,000 for an emergency shipping fund with which to begin construction of the greatest merchant fleet the world has ever known; $640,000,000 to increase temporarily the Signal Corps of the army and to purchase, manufacture, maintain, repair and operate airships; $27,826,150 for the construction, repair and preservation of certain public works on rivers and harbors; $45,150,000 to insure vessels and their cargoes with attendant expenses; $176,250,000 to provide a military and naval family allowance, compensation and insurance fund for the benefit of soldiers and sailors and their families; and $1,250,000 for the construction of a building for the increased work of the Treasury Department in Washington. To provide further for national security and defense, $11,346,400 were appropriated to stimulate agriculture and facilitate the distribution of agricultural products, and $162,500,000 to encourage the production, conserve the supply and control the distribution of food products and fuel. The President was also authorized to increase temporarily the military establishment of the United States by selective drafts; to take over for the United States any vessel owned in whole or in part by any corporation, citizen or subject of any nation with which the United States might be at war; to take possession of a site for use for permanent aviation stations of the army and navy for school purposes; to institute condemnation proceedings of lands for military purposes; to punish acts of interference with foreign relations, the neutrality and the foreign commerce of the United States; to punish espionage and better enforce the criminal laws of the United States; and $450,000 were appropriated to enforce the provisions of an act to define, regulate and punish trading with the enemy and for other purposes. To supply deficiencies in appropriations for the fiscal year 1918 and prior years on account of war expenses and for other purposes, a further appropriation of $5,356,666,016.93 was authorized and also contract obligations, to be met by future Congresses, amounting to $2,401,458,393.50; the second issue of liberty bonds amounting to $4,000,000,000 was authorized, also an additional issue of one-year certificates of indebtedness amounting to $2,000,000,000, and an issue of five-year war saving certificates amounting to $2,000,000,000. The total appropriations and contract authorizations for 1918 amounted to $21,380,730,940.46, of which, however, $7,000,000,000 of loans to the Allies is reimbursable by the foreign governments to whom the advances are made. Since this summary was made the third issue of liberty bonds amounting to $5,000,000,000 has been effected, and the fourth issue amounting to $6,000,000,000 has been authorized. In its stupendous task the people have loyally stood by the government and supported the President and Congress in all that they have undertaken.

The two decades preceding this regrettable catastrophe had witnessed remarkable progress in Democratic economic reforms. Among the more important are:

1. The popular election of United States senators — the gateway to other reforms.
2. An income tax amendment to the Federal Constitution, followed by an income tax law that equalizes taxation.
3. A reduction in import duties — the best tariff law in fifty years.
4. Currency reform — the greatest piece of constructive legislation enacted during this generation, freeing business from the despotism of high finance and politics from the grip of Wall Street.
5. This includes the restoration to the government of the sovereign right to issue paper money.
6. A rural credits law, that gives the farmer his first opportunity to borrow on long time, and at approximately what money is worth in the market.

Two anti-trust laws:

7. One creating a Trade Commission; and
8. The other, built on the theory that a private monopoly is indefensible and intolerable, lays the axe at the root of the tree.
9. A shipping law, which, by the creation of a government-owned merchant marine, enables the people to lay out new trade routes and to protect themselves from extortionate freight rates on the sea.
10. A Child Labor law which restrains the money-mad employer from stunting the body and dwarfing the mind of the child of this generation, who is to be the citizen of the next generation.
11. An eight-hour day law, which protects the wage-earner in his right to reasonable time for the enjoyment of home and for preparation for responsibilities of citizenship; and
12. Abolition of Government by Injunction — or, stated in another way, the recognition of the right of trial by jury when the alleged contempt is not committed in the presence of the court.
13. The Philippine law, which, by giving to the Filipinos the promise of ultimate independence, relieves the United States of the suspicion of having abandoned the principles of the Declaration of Independence, and enables it to resume its proper place among the nations as the foremost champion of the doctrine that governments derive their just powers from the consent of the governed.
14. And, last of the reforms to which attention will be called now, the 30 peace treaties which, by providing for investigation of all international disputes, make war between the contracting parties a remote possibility.

In the foregoing review an attempt has been made to present a history of the Democratic party from its organization to the present time, and the party's position on public issues has been shown by quotations from platforms adopted by its national conventions. While platforms are not so specific as laws, and not so elaborate as speeches, they are probably a better index to the general thought and purpose of parties than either laws and speeches — for the reason that laws are often compromises, and speeches may represent the individual opinions of the speakers rather than of the party, while platforms are written by delegates chosen for that purpose.

It will be seen that the party has met with successes and reverses, but it is also noticeable that it has adhered to its principles regardless of the immediate effect of those principles upon it. For instance, it was defeated in 1840, and yet the platform of 1840 was constantly reaffirmed and reiterated for 20 years afterward. The platform of 1892 and subsequent platforms reaffirmed and even made stronger the platform of 1888, upon which the party had suffered defeat. Between 1913 and 1916 the party carried out the platform of 1908 as well as the platform of 1912.

It may be said, however, in conclusion, that there is to-day and will continue to be an imperative need for a party thoroughly committed to the defense of the inalienable rights of the individual and to local self-government, and jealous of the encroachments of Federal power. Even when such a party is not in power, it exercises a potent influence in molding public opinion and in restraining excesses, because it is very quick to champion the cause of an individual whose rights have been trespassed upon, or the cause of a community whose rights have been ignored. In proportion as the organization is true to the principles promulgated by Jefferson and defended by Jackson, it may hope to appeal to the confidence of those who seek neither favoritism nor privileges, but are content to enjoy the blessings of a government in which the individual is protected in the enjoyment of life and liberty and in the pursuit of happiness. Consult Benton, T. H., ‹Thirty Years View› (New York 1854–56); Blaine, J. G., ‹Twenty Years of Congress› (New York 1884–86); Cooper, T. V., ‹American Politics› (Boston 1884); Cox, S. S., ‹Three Decades of Federal Legislation› (Providence 1885); Creel, G., ‹Wilson and the Issues› (New York 1916); Jefferson, T., ‹Complete Works› (New York 1904–05); ‹Jefferson Cyclopedia›; Taylor, ‹Cyclopedia of Political Science›; Vincent, ‹Platform Text-Book›).

William Jennings Bryan.

DEMOCRATIC SOCIETIES IN THE UNITED STATES, political associations in 1793 organized on the lines of the French Jacobin (q.v.) clubs. The masses in this country sympathized with the French Revolution, as essentially the same with their own, and clamored for an open stand by the government on that side. Instead, the attempt of Edmond Genet (q.v.) to drag the country into an active alliance with France, forced Washington to proclaim neutrality. This irritated popular feeling, and made it worth while for local politicians to organize a faction on the basis of French sympathies, ignoring American questions wholly. It is curious that this basic element of the Democratic or «people's party,» which charged the Federalists with being antinational, monarchic, and a «British party,» was itself the only purely foreign party ever known in the United States. In all the important towns, clubs were organized in imitation of the Jacobin clubs of France. That of Charleston openly claimed to be a branch of them and was formally recognized as such. As usual in such cases, they mimicked ludicrously the outer semblance of their prototypes, without regard to American fitness: wore cockades and liberty caps, called each other «citizen» and «citizeness,» held banquets of fraternity, etc. They were at first looked down upon by the «Republicans» or opponents of the Federalists on American questions, who accepted their votes but scorned their antics and irrelevancy; but common political opposition soon forced them into a common organism, which was called Democratic-Republican, still the official name of the party. Washington's denunciation of the societies in 1794, as having fostered the Whiskey Insurrection (q.v.), which in fact they approved, the atrocities of the Reign of Terror, and the final downfall of Robespierre and the Jacobin Club of Paris,— perhaps equally the fact that the craze had become a bore,— caused the general disappearance of the clubs or societies in 1794–95.

DEMOCRITUS, Greek philosopher of the new Eleatic school: b. Abdera between 470 and 460 B.C.; d. 370 B.C. Some Magi and Chaldeans, whom Xerxes left on his return from his Grecian expedition, are said to have excited in Democritus the first inclination for philosophy. After the death of his father he traveled to Egypt, where he studied geometry, and probably visited other countries, to extend his knowledge of nature. Among the Greek philosophers he enjoyed the instruction of Leucippus. He afterward returned to his native city, where he was placed at the head of public affairs. Indignant at the follies of the Abderites, he resigned his office and retired to solitude, to devote himself exclusively to philosophical studies. Of his numerous philosophical works mentioned by Diogenes Laertius (q.v.) only the titles and a few doubtful fragments are preserved.

In his system he developed still further the mechanical or atomical theory of his master Leucippus. Thus he explained the origin of the world by the eternal motion of an infinite number of invisible and indivisible bodies, atoms, which differ from one another in form, position and arrangement and are alternately separated and combined by their motions in infinite space. In this way the universe was formed, fortuitously, without the interposition of a First Cause. Although denying the presence of design in nature, he admitted that of law. He called the common notion of chance a cover of human ignorance, the refuge of those who are too idle to think. The eternal existence of atoms (of matter in general) he inferred from the consideration that time could be conceived only as eternal and without beginning. In the atoms he distinguished figure, size, gravity and impenetrability. Fire consists, according to him, of active globules, and spreads, like a light envelope, round the earth. The soul consists, in as far as it is a moving power, of the finest fire-atoms; but since it is acquainted with the other elements, and anything can be known only by its equal, it must be composed in part also from the other elements. Knowledge by sense is due to contact with atoms emanating from the sensed objects, through the mediation of the organs of sense. Direct contact and mediated by the organs of sense, gives rise to ‹trueborn› knowledge. The continuation of the soul after death was denied by Democritus, who divided it into two parts: into the rational part, which has its seat in the breast; and the sensual part, which is diffused through the whole body. Both constitute only one substance. He applied his atomical theory, also, to natural philosophy and astronomy. Even the gods he considered to have arisen from atoms and to be perishable like the rest of things existing. In his ethical philosophy Democritus considered the acquisition of peace of mind as the highest aim of existence. The purest joy and the truest happiness are only the fruit of the higher mental activity exerted in the endeavor to understand the nature of things, of the peace of mind arising from good actions and of a clear conscience. (See EPICURUS; LEUCIPPUS; LUCRETIUS). Consult Brieger, A., ‘Die Urbewegung der Atome und die Weltentstehung bei Leukippus und Demokrit’ (Halle 1884); Dryoff, Adolf, ‘Demokristudien’ (Leipzig 1899); Mullach, ‘Democriti operum fragmenta’ (Berlin 1843).

DEMOGEOT, dė-mō-zhō, **Jacques Claude**, French historian and poet: b. Paris, 5 July 1808; d. there, 9 Jan. 1894. He taught in the colleges at Beauvais, Rennes, Lyons, and in 1843 became professor of rhetoric at the Lycée Saint-Louis, which he left to take a chair in the faculty of letters at the Sorbonne. He wrote ‘Etude sur Pline le Jeune’ (1845–50); ‘Les lettres et les hommes de lettres au XIX siècle’ (1856); ‘Tableau de la littérature française au XVII ème siècle’ (1859); ‘Histoire de la littérature française depuis ses origines jusqus nos jours’ (1851). His poetical writings are a drama, ‘Romeo et Juliet’ (1852); ‘Contes et causeries en vers’ (1862); ‘Francesca da Rimini’ (1882).

DEMOGORGON, dē-mō-gôr′gŏn, (from Gk. *δαίμον*, demon, and *γοργός*, horrible), a mysterious divinity in pagan mythology, viewed as an object of terror rather than of worship. He is first mentioned by Lactantius (or Lutatius) Placidus in a commentary on Statius, about the 5th century A.D. By some he is regarded as the author of creation, and by others as a famous magician, to whose spell all the inhabitants of Hades were subjected. In Shelley's ‘Prometheus Unbound’ it is this dread power of the Demogorgon that overthrows Jove. The use of the word in later poets probably originated with Renaissance mythology, rather than with the classical authors.

DEMOISELLE, dā-mwā-zĕl′, the Numidian crane (*Anthropoides virgo*), an African bird which visits the south of Europe. It is about three feet in length and differs from the true cranes in having the head and neck quite feathered and the tertials of the wings elongated and hanging over the tail. It has its name from its gracefulness and symmetry of form.

Among insects, a dragon-fly of the family Agrionidæ, characterized by more slender build, exact resemblance between fore and hind wings and the wide separation of the eyes.

Among fishes, a small species of pintado (*Abudefduf Saxatilis*), common in tide-pools from Florida to Uruguay, especially about Porto Rico.

DEMOIVRE, dė-mwävr′, **Abraham**, French mathematician: b. Vitry, 26 May 1667; d. London, 27 Nov. 1754. He settled in London after the revocation of the Edict of Nantes and gained a livelihood by becoming a teacher of mathematics and solving problems. His chief works are ‘Miscellanea Analytica’; ‘The Doctrine of Chances, or a Method of Calculating the Probabilities of Events at Play’; and a work on ‘Annuities’; besides ‘Papers’ in the ‘Transactions’ of the Royal Society, of which he was a Fellow. He was selected by the Royal Society to judge the dispute between Leibniz and Newton concerning the discovery of the infinitesimal calculus (q.v.). He is best known for his investigations on complex numbers (see IMAGINARY QUANTITY), and the theorem that $(\cos\vartheta+\iota\sin\vartheta)^n=\cos n\vartheta+\iota\sin n\vartheta$) bears his name.

DEMON (Greek *daimon*), a name given by the ancients to a spirit or genius supposed to hold an intermediate place between men and the celestial deities. In Homer we find the term *daimon* sometimes applied to one or other of the gods, but it is commonly used by him in a general sense, as when we speak of «the Deity» or «Providence.» Daimon is probably derived from *daiō*, to divide or distribute, though some look upon it as equivalent to *daemon*, intelligent or wise. Hesiod uses *daimon* in a different sense from Homer. He admitted four classes of rational beings — gods, demons, heroes and men. A strict classification was not made until the popular belief had been introduced into the schools of the philosophers. Aristotle divides the immortals into gods and demons: the mortals into heroes and men. In the Greek philosophy these demons early played an important part. Thales and Pythagoras, Socrates and Xenophon, Empedocles and the Stoics, invented many fictions concerning them, each in his own way. The poetic Plato, however, goes further than any of the others. In ‘The Banquet Dialogue’ the character of the demons is thus explained: «Demons are intermediate between God and mortals; their function is to interpret and convey to the gods what comes from men, and to men what comes from the gods; the prayers and offerings of the one and the commands of the others. These demons are the source of all prophecy and of the art of the priests, in relation to sacrifices, consecrations, conjurations; for God has no immediate intercourse with men, but all the intercourse and conversation between the gods and mortals is carried on by means of the demons, both in waking and in sleeping. There are many kinds of such demons or spirits.» In other places he says of them, they are clothed with air, wander over heaven, hover over the stars and abide on the earth; they behold unveiled the secrets of the time to come, and regulate events according to their pleasure; every mortal receives at birth a particular demon, who accompanies him until his end, and conducts his soul to the place of purification and punishment. Later writers divided them, in reference to the effects ascribed to them, into good and bad spirits — Agathodemons and Cacodemons. The Romans still further developed the Greek demonology; with less, however, of a poetical character and mixed with Etruscan notions.

A full and systematic development of demonism is found in Buddhism, which recognizes six classes of beings in the universe, two only of which, those of men and angels, are good; the other four — the Asuras, irrational animals, Pretas or goblins and the denizens of hell — are evil. The Asuras are the most powerful of the wicked spirits, and are at constant war with the gods (Devas). They dwell beneath the three-pronged root of the world-mountain, occupying the nadir; while their great enemy, Indra, the highest Buddhist god, sits upon the pinnacle of the mountain in the zenith. With the Asuras are associated numerous groups, as the Rakshasas, gigantic opponents of the gods, terrible ogres with bloody tongues and long tusks eager to devour human beings, and lurking in fields and forests; the Nagas, snakes with human faces; the Mahoragas, great dragons; the Pishatshas or Vampires, etc. According to their nature and office, the different species of demons dwell in the air, the water or the earth, in holes, dens or clefts. See EGYPT, *Religion;* and also HEBREWS; ZOROASTER.

In the New Testament we find demons, «devils» or «unclean spirits» occupying a prominent place, the Greek word used being generally *daimonion* (a neuter adjective noun from *daimon*). These spirits are represented as entering into and «possessing» human beings, injuriously affecting them in some strange manner, and as being «cast out» by Christ and his disciples, and even by some among the Jews themselves (Luke ii, 19). Very different views are held regarding these accounts of demoniacal possession. Some regard them as plain statements of fact, believing that «nothing can be more plainly declared than that demons obtained possession of man's soul and body, so as to assert their mastery, and that by our Lord and his agents they were miraculously driven out.» «There is every reason to suppose that as the world has become Christian, the powers of evil have been controlled and rendered unable to gain such possession of men as they did in Judæa and neighboring places in the time of our Lord and the apostles, and as they are said to do in some parts of the world now. It is believed, moreover, that when Christ was on earth the Devil put forth his utmost power, knowing that his time was short and that he was then suffered to put forth a stronger hand than before or since in order that the triumph of Christ might be more conspicuous.» These sentences, from Blunt's 'Dictionary of Doctrinal and Historical Theology,' represent what may be called a highly orthodox view of the subject of possession. The same writer admits that «the symptoms of possession, as described in the Gospels, are those of some ordinary diseases, and we have one case which might be put down as confirmed epilepsy with suicidal mania.» The Roman Catholic Church teaches that there can be no doubt of the actuality of demoniacal possession. See EXORCISM.

In the opinion of some writers the persons spoken of in the New Testament as possessed of devils were really sufferers from common diseases, being the unhappy victims of madness, monomania, hypochondria, hysteria, epilepsy and kindred ailments, and that Christ in dealing with them merely accommodated his language to the prevalent opinions of the time.

However much the first teachers of Christianity participated in the beliefs of their fellow-countrymen respecting the doctrine of spirits, there can be no doubt that their successors, the fathers and teachers of the Church, were considerably influenced by the popular ideas on this subject. In the early Church the «energumens» or persons possessed were recognized as a distinct class, and the Church originated a regular discipline in regard to them. The lives of the saints and holy men and women contain many a story in which demons figure, and the office of exorcist was long one of importance. It did not readily occur to the Jew or early Christian to deny even the existence of the gods of the heathen nations; they were simply regarded as demons or devils. We thus find in literature up till the Middle Ages, and even on this side of them, the divinities of Oriental, classical, and Scandinavian mythology figuring as princes of hell. Consult such works as Sir Walter Scott, 'Demonology and Witchcraft'; Conway, 'Demonolgy and Devil-Lore'; and for the demons of Scripture the dictionaries of the Bible, as Smith, Hastings, and the 'Encyclopædia Biblica' (Vol. I, 1899); also Horst, 'Dæmonomagie' (2 vols., 1818); and 'Zauberbibliothek' (6 vols., 1821–26); Ukert, 'Ueber Däimonen, Heroen, und Genien' (1850); Bastian, 'Der Mensch in der Geschichte' (3 vols., 1860); Taylor, 'Primitive Culture' (2 vols., 1871); Roskoff's admirably learned 'Geschichte des Teufels' (2 vols., 1869); Maspero, 'Dawn of Civilization' (New York 1894); Nevins, 'Demon Possession' (Chicago 1895); Alexander, 'Demoniac Possession in the New Testament' (Edinburgh 1901); Townsend, 'Satan and Demons' (Cincinnati 1902); Carus, 'History of the Devil and the Idea of Evil from the Earliest Times to the Present Time' (Chicago 1900); Tambornino, 'De antiquorum dæmonismo' (1909); Wendt, 'Christentum und Dualismus' (1909); also some of the older books, as Bodin, 'De Magorum Demonomania' (1581); and the like. See ANGELS; ANIMISM; DEVIL; EVIL; EXORCISM; HELL; SERPENT-WORSHIP; WEREWOLF; WITCHCRAFT; ZOROASTER.

DEMONETIZATION. See BIMETALLISM.

DEMONIAC, a term to designate an old superstitious idea, that of a person whose mental faculties are overpowered, and whose body is possessed and actuated by some created spiritual being; especially a person possessed of or controlled by evil spirits. See DEMON.

DEMONOLOGY, the scientific study of beliefs in and evidences of the existence and influence of evil spirits. It is founded on the theory that there are beings out of the body as well as those in the body, and that these disembodied beings have the power to influence, control and obsess to their hurt those now living in the flesh. The belief in demons is prevalent particularly in India, South Africa and China, and in some sections of Ireland. Its foundation seems to lie in the recognition of the evil influences constantly at work in human consciousness to distort and deform the good, and the personification of such influences. The bibliography of the subject is very large, but consists almost wholly of tales of incidents which are ascribed to the activities of the assumed evil spirits. All of the investigations that have been made have not as yet resulted in what may be rightly termed a science and the subject remains rather in the status of a religious belief. (See WITCHCRAFT). Consult Conway, M. D., 'Demonology and Devil-Lore' (2 vols., New York 1889); Nevins, Rev. J. L., 'Demon Possession and Allied Themes' (Chicago 1896); Scott, Sir Walter, 'Demonology and Witchcraft' (London 1868); Seymour, St. J. D., 'Irish Witchcraft and Demonology' (Baltimore 1913); Tonna, C. E. P., 'Principalities and Powers in Heavenly Places' (New York 1843); Waite, A. E., 'Devil Worship in France' (London 1896).

DEMONSTRATION, a proof in which the conclusion necessarily follows from the premises, and the rejection of the conclusion, therefore, always involves a contradiction. The great domain of demonstration is mathematics, in which all the proofs, however complicated, are drawn from a few simple axioms, founded on intuitive perception of number, time and space. In ordinary language, however, demonstration is often used as synonymous with proof and sometimes even more loosely as synonymous with explanation and exhibition, as when we speak of anatomical demonstration. In military tactics it is an operation which may be performed to the end of deceiving the enemy in regard to the real measures to be taken against it.

DEMOPHON, or **DEMOPHOON**, in mythology, the son of Celeus and Matanira, whom Ceres loved so passionately that she wanted to make him immortal. To attain that purpose she made him pass through fire, but, being disturbed by the cries of his mother, who chanced to see him, the goddess hurriedly mounted her car, leaving Demophon to perish in the flames.

DE MORGAN, Augustus, English mathematician: b. Madura, southern India, 27 June 1806; d. London, 18 March 1871. In 1828 he was appointed professor of mathematics in University College, or as it was then called, London University — a situation which he held until 1866, with the exception of the five years from 1831 to 1836. Previous to this appointment he had turned his mathematical attainments to account in the service of some of the London assurance companies and continued throughout his life the confidential adviser of some of the most important of these associations. He was first president of the London Mathematical Society and was a member of the Royal Astronomical Society and did much to encourage a decimal system of coinage. Among his many works are 'Elements of Arithmetic' (1830); 'Elements of Algebra' (1835); 'Elements of Trigonometry' (1837); 'Essay on Probabilities and on Their Application to Life Contingencies and Insurance Offices' (1838); 'Formal Logic' (1847), and contributions to various encyclopædias. A memoir was written by his widow (London 1882).

DE MORGAN, William Frend, English novelist: b. London, 16 Nov. 1839; d. Chelsea, 15 Jan. 1917. He was educated at University College School, was a student at the Royal Academy in 1859 and adopted art as a profession. In the years following 1864 he was chiefly engaged in stained-glass work; in 1870 turned his attention to ceramic work, when his experiments in lustre, at that time not much known in England, attracted some attention among artists. In 1905 he commenced as a writer of fiction with 'Joseph Vance,' which achieved an immediate success. The novels that followed were equally successful, so much so that De Morgan was soon regarded as one of the most popular and pleasing novelists of his generation. His other publications are 'Alice-for-Short' (1907); 'Somehow Good' (1908); 'It never Can Happen Again' (1909); 'An Affair of Dishonor' (1910); 'A Likely Story' (1912); 'When Ghost Meets Ghost' (1914). Consult Phelps, W. L., 'Essays on Modern Novelists' (New York 1910), and Cooper, F. T., 'Some English Story-Tellers' (ib. 1912).

DEMOSTHENES, famous Greek orator: b. Athens, 384 or 385 B.C.; d. 322 B.C. His father left him a considerable fortune, of which his guardians attempted to defraud him. Demosthenes, at the age of 17 years, conducted a suit against them himself, and gained his cause. He studied rhetoric under Isæus, and benefited in some degree from the teachings of Isocrates and Plato. But nature had placed great obstacles in his way, and his first attempts to speak in public were attended with derision. He not only had very weak lungs and a shrill voice, but was unable to pronounce the letter *r*. These natural defects he endeavored to remedy by the greatest exertions. He succeeded by the advice of the actor Satyrus, who advised him to recite with pebbles in his mouth, on the roughest and steepest places. To strengthen his voice he exercised himself in speaking aloud on the seashore, amidst the noise of the waves. At other times he shut himself up for months in a subterranean room, with his head half-shaved, that he might not be tempted to go out, and endeavored to acquire dignity of manner by practising before a mirror. He is also said to have transcribed the history of Thucydides eight times for the purpose of forming his style. After such a laborious preparation he composed and delivered his masterly speeches, of which his enemies said that they smelt of the lamp, but to which posterity has assigned the first rank among the models of eloquence — speeches in which he openly opposed the foolish wishes of the multitude, censured their faults and inflamed their courage, their sense of honor and their patriotism. He thundered against Philip of Macedon in his orations known as the Philippics, and instilled into his fellow-citizens the hatred which animated his own bosom. The first Philippic was delivered in 352 B.C., when Philip could no longer conceal his ambitious scheme of subjugating the whole of Greece. In 349 the city of Olynthus, the northern ally of Athens, was captured and destroyed by the Macedonians, and shortly afterward Philip took possession of the Pass of Thermopylæ. The orator insisted on the necessity of immediately preparing a fleet and an army; urging the Athenians to begin the war themselves; to make Macedonia the theatre, and to terminate it only by an advantageous treaty or a decisive battle. They admired and approved his plans, but did not execute them. The celebrated Phocion, who knew the weakness of Athens, unceasingly advised peace. Demosthenes went twice to the court of Philip to negotiate, but without success. On his return he recommended war and endeavored to arm not only Athens, but all Greece. When Philip had finally penetrated into Phocis, through the Pass of Thermopylæ, and had taken possession of the city of Eletea (338), to the terror of Athens, Demosthenes obtained a decree of the people for fitting out a fleet of 200 vessels, marching an army to Eleusis and sending ambassadors to all the cities of Greece, for the purpose of forming a universal confederacy against Philip. He was himself among the ambassadors, and prevailed on the Thebans to receive an Athenian army within their walls. He also exerted himself actively throughout Bœotia, and by his efforts a numerous army was collected to act against Philip. A battle was fought near Cheronea, and the Greeks were vanquished. Demosthenes fled, like thousands more. Nevertheless he was desirous of delivering a funeral oration over those who had fallen in battle. Æschines, his rival, did not fail to attack him on this account. The hostility between the two orators was the occasion of the speech 'De Corona' (on the crown), which resulted in the triumph of Demosthenes and the exile of his adversary. Philip having been soon after assassinated, Demosthenes endeavored to rouse Athens to regain her independence, but Alexander's dreadful chastisement of her ally Thebes filled the Athenians with such terror that they sued for mercy. It was with difficulty that Alexander could be persuaded to desist from his demand of the surrender of Demosthenes and some other orators; for the Macedonians feared Demosthenes more than they did the armies of Athens. He was afterward fined 50 talents on a charge of bribery, and being unable to pay the fine, was thrown into prison, from which he escaped and fled to Ægina, where he remained till the death of Alexander. Then followed the war with Antipater. Demosthenes again appeared in public, and endeavored to persuade the small Grecian states to unite against Macedonia. The Athenians received him with honor; but the war was unsuccessful, and Antipater insisted upon his being surrendered to him. Demosthenes fled to the Temple of Poseidon, in the island of Calauria, on the coast of Argolis, but finding himself not secure, he took poison, which he always carried about with him. He died, according to the general account, in 322 B.C., at the age of 60 or 62 years.

The character of Demosthenes is by most modern scholars considered almost spotless. Cicero pronounces him to be the most perfect of all orators. He always spoke as circumstances required, and was by turns calm, vehement, or elevated. He carried the Greek language to a degree of perfection which it never before had reached. In energy and power of persuasion, in penetration and power of reasoning, in the adaptation of the parts to the whole, in beauty and vigor of expression, in strong and melodious language, he surpassed all his predecessors. Everything in his speeches is natural, vigorous, concise, symmetrical. This alone can explain his great influence over his contemporaries. We have under his name 61 orations, 56 exordiums, and 6 letters, some of which are not genuine. Among the oldest editions of the orations the best is that of Paris, 1570, in folio, with the commentaries of Ulpian. The first edition of his complete work, Greek and Latin, was edited by Hieronymus Wolf (Basel 1549). The edition by Bekker (Leipzig 1855) is considered among the best of the modern ones. (See ORATION ON THE CROWN). Consult Schäfer, 'Demosthenes und seine Zeit' (2d ed., Leipzig, 1885–87); Jebb, 'The Attic Orators' (2 vols., London, 1875–76); Wright, 'Short History of Greek Literature' (New York, 1907).

DEMOTIC, or ENCHORIAL, Alphabet. See HIEROGLYPHICS.

DEMOTICOS, or DEMOTIKA, Turkey in Europe, a town in the province of Adrianople, on the Maritza, five miles south of Adrianople. The town has some silk, woolen, and earthenware manufactures. The agricultural pursuits consist of the raising of vegetables, tobacco and wine. It is the see of a Greek archbishop, and is defended by a citadel, containing a palace, in which several of the Turkish sultans resided before they gained possession of Constantinople. Charles XII remained here for some time after the disaster of Pultowa. It was occupied during the Balkan War by the Bulgarians. The Treaty of London, 31 May 1913, confirmed the Bulgarian possession of the town, but by the final Treaty of Constantinople, 29 Sept. 1913, it was restored to Turkey. Pop. 8,700.

DEMPSTER, John, American clergyman and theological educator: b. Florida, N. Y., 2 Jan. 1794; d. 28 Nov. 1863, while on his way to California. His father, the Rev. James Dempster, was a graduate of the University of Edinburgh and became one of the early helpers of John Wesley in England. After he came to America he became a minister of the Presbyterian Church and was pastor of the church at Florida, N. Y., for many years. In 1816 John Dempster entered the ministry of the Methodist Episcopal Church. He served important churches and was 12 years a presiding elder. He also served as a missionary in Buenos Ayres for a short period. He was one of the founders of the first theological school of the Methodist Episcopal Church, which was first located at Newbury, Vt., and then at Concord, N. H., and was called the General Biblical Institute. In 1867 it was moved to Boston and became the Boston University School of Theology. Mr. Dempster was president and professor, 1845–54. He was also one of the founders and the first president of Garrett Biblical Institute, Evanston, Ill., serving from 1855 to 1863. He planned to found a third theological school in California and was on his way to that field when stricken. His 'Lectures and Addresses' were collected and published in 1864.

DEMPSTER, Thomas, Scottish scholar: b. Cliftbog, Aberdeenshire, Scotland, 23 Aug. 1579; d. near Bologna, Italy, 6 Sept. 1625. His autobiography, which contains a curious mixture of truth and fiction, states that he became heir to the title of Baron of Muresk, but that the property accruing thereto had been fraudulently handled by his father and he was unable to regain it. Dempster's adherence to the Roman Catholic faith was one cause of his estrangement from his father. He studied at Cambridge, Paris, Louvain, Rome and Douay and became successively professor at Tournay, the College of Navarre at Paris, at Poitu, Nîmes and again at various colleges of Paris. Quarrels forced him to leave Paris, and after a brief service as historian to James I of England he became professor of civil law at Pisa and later of humanities at Bologna — a period full of quarrels and scandalous duels. Urban VIII made him a knight and gave him a pension. He remained at Bologna until his death. Bayle says that though his business was only to teach a school he was as ready to draw his sword as his pen and as quarrelsome as if he had been a duelist by profession. Scarcely a day passed, he adds, in which he did not fight either with his sword or at fisticuffs, so that he was the terror of all the schoolmasters. Dempster's works are very numerous and exhibit proofs of great erudition. Among them his 'Historia Ecclesiastica Gentis Scotorum' is the best, though, instead of being as its title would indicate an eccelsiastical history of Scotland, it is merely a list of Scottish authors and Scottish saints. It is full of astounding inaccuracies and deliberate untruths. It was edited by the Ballantyne Club in 1829. His really most valuable work is 'De Etruria Regali,' an edition of which was published at Florence in 1725. His Latin poems were also highly esteemed by his contemporaries.

DEMULCENTS, remedies of a mucilaginous nature that are used in inflammatory conditions of the mucous membrane. They consist largely of mixtures of the oils, gums and albumins. Thus sweet oil, acacia, tragacanth, marshmallow, slippery elm, white of egg, cream, milk and flaxseed are all types of this class of remedies.

DEMURRAGE, in maritime law, is used to signify the amount to be paid by the charterer to the owner of a ship for detaining her in port longer than the time specified. The time of delay in port for a cargo, for convoy, etc., is usually stipulated in the charter-party and also the allowance to be made in case of longer delay for those objects, and this time is sometimes specified in working days or lay days, as distinguished from holy days when no cargo can be put on board. All ordinary cases of detention, such as port regulations, the overcrowded state of the harbor and the like, or even from the unlawful acts of the custom-house officers, are at the freighter's risk, and demurrage must be paid although it is proved that the delay was not caused by any fault of his. But demurrage cannot be claimed when the ship is detained by a public enemy or by the hostile occupation of the port, nor if the detention is caused by the owner, master or crew. The claim ceases whenever the vessel is cleared and ready for sailing, though she should be detained by adverse winds or rough weather.

DEMURRER, a pause or stop put to the proceedings of an action upon a point of difficulty, which must be determined by the court before any further proceedings can be had therein. He that demurs in law confesses the facts to be true as stated by the opposite party, but denies that by the law arising upon those facts any injury is done to the party or that he has made out a lawful excuse. *Demurrer upon evidence* is a statement by the party making it that he will not proceed because the evidence on the other side is not sufficient to maintain the issue. A *general demurrer* is one not specifying an objection, but relying on some defect in substance; a *special demurrer* specifies some particular defect in the form of the adversary's allegation. A demurrer when allowed puts an end to the suit, unless it is confined to only a part of the bill. If overruled a fresh defense is required. Generally there is a provision that the counsel must certify that the demurrer is well-founded in law and an affidavit must be made by the defendant that it is not interposed for delay.

DEMY, dĕ-mī. (1) The popular term for the *demi-socii* or half-scholarships of Magdalen College, Oxford; the seniors valued at $500 and the juniors at $400 a year. (2) A term designating American writing paper 16x21 inches in size.

DENAIN, dė-năṅ, France, town in the department of Nord, six miles from Valenciennes, on the left bank of the Scheldt, which is here navigable. It stands in the centre of a coal-field, and both coal and iron are extensively mined and supply several blast-furnaces and other ironworks. Shipbuilding and the manufacture of beet-sugar, beer and spirits are also carried on. Denain had once a celebrated abbey, founded in 764. A great victory was gained here in 1712 by the French under Villars over the allies under Eugene and Albemarle. Pop. 26,800.

DENARIUS, a Roman silver coin, the principal one under the republic and the empire, originally of the value of 10 asses or pounds of copper; but afterward of 16 asses, when the weight of the ass was reduced to one ounce in 217 B.C. It was first minted in 269 or 268 B.C., when it weighed 72 grains. It was equivalent to about 16 or 17 cents of United States money. The obverse bore the helmeted head of Roma and the mark of its value X — that is, 10 asses; the reverse had Castor and Pollux upon it. Later other mythological and historical types were cast upon it. It continued to be the ordinary silver currency down to the age of the Emperor Septimus Severus and his sons, by whom pieces composed of a base alloy were introduced. The name was also given to gold coin struck during the empire; its full title was *denarius aureus*, and it was generally called *aureus*, but by Pliny uniformly *denarius*. It passed for 25 silver *denarii*. Diocletian in 296 A.D. gave the name *denarius* to a coin of copper issued by him. The *denarius* of Tiberius is the penny mentioned in the New Testament. In the British formula "£. s. d." the d. is representative of the denarius, or silver penny of mediæval days; when a penny had nearly the purchasing power of the dollar of our day. Hence, as the English translation runs, the master of the vineyard agreed with the laborers, "for a penny a day," in the parable in Matthew xx. The copper penny was not coined in England until 1665. A strong effort was made to secure, in the Revised Version of the New Testament of 1881, the original word "denarius," but the word "penny" was retained.

DENATURED ALCOHOL, Alcohol that has been rendered unfit for use as a beverage or as a medicine by the addition of poisonous and offensive substances. It is also called *denaturalized* and *denaturized alcohol*, and *industrial alcohol*. Denature means to change the nature of, and the reason for changing the nature of alcohol is that it may not be subject to the Government tax on alcohol as a beverage, and thus be sold at a low price for industrial purposes. The first official recognition of denatured alcohol as a distinctly industrial substance was the action of the British government in 1855, in relieving it from the payment of duty demanded on alcoholic beverages. The denaturing agent then used was, as now, methyl or wood alcohol, added to the ethyl or grain alcohol in the proportion of 10 per cent. The mixture was called methylated spirit.

France, in 1872, provided a special tax of about 30 cents per gallon on alcohol denatured for use in the arts. In Germany, denatured alcohol was first freed from tax in 1879. The Netherlands untaxed the denatured spirit in the same year. Austria-Hungary followed in 1888; Sweden in 1890; Switzerland in 1893; Norway in 1894; and Belgium in 1896. The United States law went into effect in 1907. At that time the selling price of proof alcohol in the United States was about $2.50 a gallon, and the Government tax was $2.08, so that the distiller received about 42 cents a gallon. Being relieved of this tax on the denatured product the distiller could afford to sell it for 42 cents, rendering it available for a variety of uses. As a matter of fact it can be made for much less than 42 cents a gallon, as the price in Germany has been as low as 15 cents, and the figures presented in Congress at the time the proposed law was discussed went to show that it might be made as low as 11 cents a gallon. In 1916, proof alcohol was selling for $2.04 per gallon, the tax was $1.10 per gallon, and denatured alcohol was 60 cents.

The uses to which denatured alcohol may be applied, for light, fuel and power purposes, all require a cheap article, as it comes into competition with petroleum products that are sold at a low figure. But because alcohol is better than petroleum for many purposes, often it will be used even at a somewhat higher price. The price of $2.50 a gallon, however, was prohibitive, in most cases, to industrial uses.

Ordinary alcohol, specifically called ethyl alcohol, for the purpose of taxation and storing in bonded warehouses, is made to a uniform standard called proof alcohol, which is 94 per cent pure, the remainder being water. For use as a beverage or medicine this is diluted. (See Alcohol). To denatured alcohol there is added to the proof alcohol a small quantity of methyl or wood alcohol, which is distinctly poisonous, and which of course renders it unfit to drink. In order to spoil the taste and render it offensive, a little benzine or pyridine is also added, when the denaturizing is considered complete, and this product is called «completely denatured alcohol.» It is the regular commercial grade.

The United States law provides that «to every 100 gallons of ethyl alcohol of 180 degree proof shall be added 10 gallons of approved methyl (wood) alcohol, and half a gallon of approved benzine,» and that this mixture shall be free from taxation as alcohol.

Besides the commercial type, the Government provides also for «specially denatured alcohol» to be used for certain manufactures in which the commercial type would be injurious. The latter can be used in making soaps, liniments, compound camphor, etc., but not for medicines taken internally. For example, the alcohol used in making chloral is denatured by passing through it a current of chlorine gas. Alcohol used in making chloroform is denatured with chloride of lime. In varnish factories the denaturing agent used is turpentine. In vinegar factories the alcohol is denatured by adding an equal quantity of vinegar. For other similar specific uses several resins are employed; also camphor, acetic or nitric acids, acetic ether, acetone oil, several of the coal-tar dyes, naphthaline, nitrobenzol, castor-oil, caustic soda, phenolphthalein, chloroform, formalin and others. The United States law does not specify the articles and quantities, but simply the condition that it must be rendered unfit for use as a beverage or medicine, and making the revenue officers the judges as to when this has been accomplished. About 50 processes have been published for making denatured alcohol.

Denatured alcohol has to be made in a distillery, and a bonded warehouse must be erected on the premises, and accommodation provided for a revenue officer to watch the process. Dealers in denatured alcohol and manufacturers who use it must secure permits from the collector of internal revenue in that district. Manufacturers using the «special» grade have to give bonds.

To protect denatured alcohol from accidental handling as ordinary alcohol, the Government requires that it be put up in cans of light green color, not smaller than five nor larger than 135 gallons, and that these cans be marked «Denatured Alcohol» in letters of red, at least one and one-half inches long. Dealers in beverages are forbidden to have such cans of denatured alcohol about their premises.

Denatured alcohol may be manufactured more cheaply than ordinary alcohol by using cheaper materials, such as are unfit for use in making a beverage. Ordinary alcohol is made from grain, either Indian corn, wheat or barley. Alcohol for industrial use may be made from any starchy vegetable substance, or a waste by-product, as the poorest grade of molasses, or the waste of a canning-house. In the Louisiana sugar belt and in Hawaii, where molasses is cheap, that is probably the best material; in Maryland, where there are many canneries, fruit waste could be used; in Kansas and Oklahoma in the years when there is an oversupply of corn, it can be made into denatured alcohol; where potatoes are very cheap, these can be employed. In such ways denatured alcohol can be produced at a cost low enough to justify its use in lamps and for fuel, and for operating engines of the gasoline type, as for automobiles. Since wood alcohol is the principal and most important article used in denaturizing, the endeavor of the trade is to cheapen it, but while wood pulp and sawdust (the raw material) are cheap, they do not yield a large quantity of alcohol, hence much material has to be handled in its manufacture. Any woody fibre or cellulose can be used, however.

Alcohol does not burn with a bright enough flame to make a good illuminant, but by using its heat to render a mantle incandescent it gives a good light, that is safer than kerosene, and presents no nuisance of smell and accumulated carbon.

As a fuel, denatured alcohol is convenient, clean and safer than petroleum. As a motive power fluid, it is cleaner and better in some ways than any of the petroleum products, but is also more costly. It requires an engine and carburetter specially designed for alcohol to render it practicable for automobile and similar engines.

Denatured alcohol is commonly used in the manufacture of aniline dyes, electric apparatus, starch, transparent soaps, tobacco, shellac varnish, celluloid, paints, hats, shoeblacking, insect powders, disinfectants, cements, gas mantles, cartridges, anti-freezing mixtures and in cleaning and polishing preparations.

For the fiscal year ended 30 June 1915, the Commissioner of Internal Revenue reported the manufacture of 5,386,647 gallons of completely denatured alcohol and 8,599,822 gallons of specially denatured alcohol.

Bibliography.— Brachvogels, ‘Industrial Alcohol’ (1907); Herrick, ‘Denatured or Industrial Alcohol’ (1907); Wiley, ‘Manufacture of Denatured Alcohol’ (1910).

DENBIGH, dĕn'bĭ, Wales. (1) A maritime county of North Wales; area, 426,084 acres. Oats, barley and rye are the principal crops; sheep are raised in the uplands; and woolens are manufactured. The principal industry is mining, coal, iron, lead and slate being extensively worked. The county is divided into two divisions for parliamentary purposes, each returning one member. Pop. 144,783. (2) A municipal and parliamentary borough, capital of the county of Denbigh. Population of municipal borough, 6,892.

DENBY, Charles, American diplomatist: b. Mount Doy, Va. 1830; d. Evansville, Ind., 13 Jan. 1904. He was educated at Georgetown University and Virginia Military Institute and became a lawyer. Having served through the Civil War and attained the rank of colonel, he resumed the practice of law. He was appointed minister to China in 1885 and served for 13 years in Peking. In 1898 he was made a member of the commission to investigate the conduct of the war with Spain, and in 1899 a member of the Philippine Commission. During the war betwen China and Japan the Japanese government placed its interests in China in his care. He wrote ‘China and Her People’ (2 vols., 1906).

DENDERAH, dĕn'dėr-ą, Egypt (the Tentyra of the Greeks and Romans), a village on the left bank of the Nile; lat. 26° 10′ N.; long. 32° 40′ E.; celebrated for its temple, one of the most magnificent and best preserved remains of antiquity in Egypt, begun under Ptolemy XI and completed in the reign of the Emperor Tiberius. It was dedicated to the goddess Athor or Aphrodite, and is enclosed within a wall built of sun-dried bricks, in some parts 35 feet high and 15 feet thick. The portico of the temple consists of 24 columns, in three rows four deep on either side, each above 22 feet in circumference, and 50 feet high. The interior consists of a number of apartments, all the walls and ceilings of which are covered with religious and astronomical representations, including the figure of Athor. The roofs are flat, and are formed of oblong masses of stone resting on the side walls, or on rows of columns carried down the middle of the building, and whose capitals are richly ornamented with the budding lotus. The only light admitted to the interior was by small perpendicular holes cut in the ceiling, or by oblique apertures in the sides. The hieroglyphics and ornamentation of the temple belong to the declining period of Egyptian art. The effect of the portico is greatly heightened by the fact of its roof being retained; and on the ceiling is the famous zodiac, at one time regarded as of great antiquity. Another remarkable object belonging to the temple, and which excited the greatest interest, was a celestial planisphere or zodiac, forming the ceiling of one of the upper chambers. This was carefully removed from its original place in 1822, and conveyed to Paris. Flinders Petrie in 1898 excavated the tombs of the ancient princes of Denderah. Consult Mariette, ‘Denderah’ (5 vols., 1869–80); Petrie, ‘Denderah’ (1900).

DENDERMONDE, dĕn-dėr-mōn'dĕ, or **TERMONDE,** Belgium, town in the province of East Flanders at the junction of the Dender and the Scheldt rivers, 12 miles northwest from Brussels. It is strongly fortified, defended by a citadel and surrounded by low, marshy ground which can be laid under water. It contains manufactories of woolen and linen goods, tobacco and other articles. It is an important railroad centre. It possesses a college, a public library, an academy of design and architecture, a music school, a fine church in which are a number of paintings by Van Dyck and De Crayer and a remarkably decorated town-hall of the 14th century. Pop. 10,193.

DENDRERPETUM, dĕn-drėr'pĕ-tŭm, a small lizard-like fossil amphibian, discovered by Dawson and Lyell in Nova Scotia; so named from its being found in the interior of a fossil trunk and hence supposed to have been of arboreal habits. It is now regarded as a labyrinthodont and is ranked by some scientists under the suborder *Labyrinthodontia Vera.* The skull is parabolic in form.

DENDRITE (Gr. «tree-like»), any mineral in which arborescent forms resembling trees or mosses occur. These peculiar markings, which are often of great delicacy and beauty, are commonly due to the presence of certain metallic oxides which have separated from the general mass of the mineral. Moss agate is a familiar example of a dendrite, the markings in this case being due to the presence of oxide of manganese. The name «dendrite» is also applied to the complex, tree-like crystalline growths often observed in the case of silver, lead, copper and certain other metals. Manganese oxide dendrites on limestone are often, but incorrectly, called fossil ferns.

DENDRITIC DRAINAGE. See TRELLISED DRAINAGE.

DENDROBATES, a genus of South American tree-frogs representing the family *Dendrobatidæ,* which is remarkable in having species in West Africa and Madagascar, as well as seven species in tropical South America. These frogs are small, brightly colored, toothless, and have not webbed feet, but adhesive disks on their toes, fitting them for life in trees; and are noteworthy from the use made of them by man. The Indians heat these frogs before a fire, then scrape off the poison exuded under the pain of the heat, and with it poison their arrowheads. This skin-poison is also employed for dyeing the Amazonian green parrots in a fanciful way. To do so feathers of the part to be dyed are pulled out, and these places are rubbed with the collected poison, or simply with a living frog (*Dendrobates tinctoria*), and again when the new feathers begin to appear. «The result is that these appear yellow instead of green, and since the Brazilians . . . are rather partial to these artificially produced freaks or ‘contrafeitos’ as they call them, the industry is kept up.» These little frogs are remarkably attentive to their young. They spawn in shallow puddles that quickly dry up. The father frog therefore sits down in the puddle as soon as the eggs hatch, whereupon the tadpoles crawl upon his back (the brood is small), and stick there by sucker-like mouths while he carries them to another wet place, and so on until their metamorphosis is finished. Consult Gadon, 'Amphibia and Reptiles' (New York 1901).

DENDROBIUM, an extensive genus of epiphytes belonging to the family *Orchidaceæ*, natives of Asia and Australasia, where they are found in great numbers in the damp tropical forests. About 600 species are known, of which many are cultivated in hothouses. The genus varies greatly in the character of its flowers, some of the species being among the finest of the orchids. Among these are *D. nobile, D. chrysanthum, D. gibsonii,* and *D. densiflorum.*

DENDROLAGUS, a genus of marsupial animals, popularly known as tree-kangaroos, from their habit of living in trees. Their fore legs are longer and stouter in proportion than with the kangaroo, and their hind legs shorter. They move in the tree-tops with a jumping motion of the hind legs, clinging to the landing place with the forelegs, which are armed with long sharp claws. Four species are known, one of them (*D. lumholtzi*) being a native of northern Queensland, and the other three (*D. ursinus, inustus* and *dorianus*) natives of the island of New Guinea.

DENEEN, Charles Samuel, American lawyer and public official: b. Edwardsville, Ill., 4 May 1863. He was graduated at McKendree College in 1882, was admitted to the bar in 1886 and practised law in Chicago until 1904. In 1892 he was a member of the Illinois house of representatives, was attorney for the Sanitary District of Chicago 1895–96, and attorney for Cook County 1896–1904. He was governor of Illinois from 1905 to 1913, and afterward served as attorney for a committee of investigation into the Chicago voting-machine scandal.

DENGUE (dĕn'gā) **FEVER** (also called dandy, breakbone, and seven-days' fever, scarlatina rheumatica, abu rokab), a specific disease usually distinguished by an acute onset with fever, intense muscular and joint pains, and later by a measle-like eruption. In some countries it is endemic and has three times assumed pandemic proportions. It is found in Eastern countries — Arabia, China, India, Africa, especially in Egypt and Zanzibar. It has been found in Spain, Greece and Asia Minor; in Bermuda, the West Indies, the southern United States; in parts of South America; and in Sydney and Brisbane, Australia. It is essentially a disease of the tropics, where it is usually found in hot weather, in the coast and river districts and low levels more than in inland parts; and it would seem to be a communicable disease, depending upon some micro-organism. As a rule the disease lasts from four to eight days, and the prognosis is favorable. Complications or a fatal end are very rare. It is frequently confounded with influenza, yellow fever, rheumatism, measles, scarlet fever. Treatment is by means of quinine, ice, the newer antipyretics and opium.

DENHAM, Dixon, English explorer: b. London 1786; d. Sierra Leone, 9 June 1828. He was educated at Merchant Taylors' School with a view to entering business, but joined the army in 1811, and fought in the Peninsular campaign and in the Netherlands. In 1823–24 he was engaged, in company with Captain Clapperton and Dr. Oudney, in exploring the central regions of Africa. The account of the expedition was prepared by Denham, and published under the title 'Narrative of Travels and Discoveries in Northern and Central Africa' (1826). In 1826 he went to Sierra Leone as superintendent of the liberated Africans, and in 1828 was appointed lieutenant-governor of the colony.

DENHAM, Sir John, English poet: b. Dublin, Ireland, 1615; d. London, March 1669. He was the son of Sir John Denham, chief baron of the exchequer in Ireland, and was educated in London and at Oxford. In 1641 he first became known by his tragedy of 'The Sophy.' This piece was so much admired that Waller observed, «Denham had broken out like the Irish rebellion, 60,000 strong, when no person suspected it.» In 1643 he published the first edition of his most celebrated poem, called 'Cooper's Hill.' Among the last and best of his productions is a poem in which he commemorated the death of Cowley. In 1665 a corrected edition of his works appeared. He was forced to escape to France in 1648 because of his implication in the secret service of Charles I. Returning to England in 1652, he was appointed after the Restoration as surveyor-general of the royal buildings. His tomb is at Westminster Abbey. Consult Ward, 'English Poets' (London 1880–83). His poetry generally is remarkable for its rhythmic flow and smoothness, leading up sometimes to passages of force and dignity.

DENHART, or **DENHARDT, Clemens** and **Gustave,** German explorers: b. Zeitz 1852 and 1856, respectively. They made a tour in 1878, through the Tana River region, East Africa, to establish German trade, and another from the island of Lamu to Vitu in March 1885, the sultan of the Swahili desiring a treaty with Germany based upon proposals made by him 18 years previously. Clemens Denhart transferred part of the territory acquired by him to the German Colonist Society, the Deutsche Witugesellschaft. All rights to this territory were ceded by Germany to England in 1890, in exchange for the island of Helgoland, the brothers receiving an indemnity of 150,000 marks from the German government. An important work by Clemens Denhart was published in 1883 in the *Mitteilungen des Vereins für Erdkunde* at Leipzig under the title 'Anleitung zu geographischen Arbeiten bei Forschungsreisen.'

DENIA, dā'nē-ā, Spain, seaport on the east coast of Alicante. Roman antiquities abound in the neighborhood. The harbor is small and there is a lighthouse. Raisins and salt are the principal articles of commerce.

DENINA, dā-nē'nā, **Carlo Giacomo Maria,** Italian historian: b. Revello, Piedmont, 28 Feb. 1731; d. Paris, 5 Dec. 1813. He studied at Turin, and in 1758 became a professor in the university there. In 1769 he published the first three volumes of his 'Delle rivoluzioni d'Italia,' his most important work, which was finished in 1772. He went to Berlin in 1782, and was appointed a member of the Academy. He published 'La Prusse littéraire sous Frédéric II'; 'Political and Literary History of Greece'; and 'Letters from Brandenburg,' etc. His 'Clef des Langues,' dedicated to Napoleon, brought him the position of librarian to the emperor. His 'Rivoluzioni' was translated into English by Langhorne (London 1773). Consult Surra, 'Vita de Carlo Denina' (Turin 1902).

DENIO, Hiram, American jurist: b. Rome, N. Y., 21 May 1799; d. Utica, 5 Nov. 1871. He studied law, was admitted to the bar and practised at Rome and Utica. He was appointed circuit judge of the Fifth New York circuit, and was three times elected judge of the State Court of Appeals, the first time in 1853. He retired from that office in 1866. He edited with William Tracy 'Revised Statutes of New York' (1852), and published 'Reports of Cases Argued and Determined in the Supreme Court and in the Court for the Correction of Errors' (5 vols., 1845–48).

DENIS, Fr. dė-nē, or **DENYS, Saint,** or **DIONYSIUS, Saint,** first bishop of Paris, and patron saint of the French nation. Exact information regarding Saint Denis cannot be obtained, but there is no doubt he belongs to the 3d century. In the Middle Ages it was believed by many that Saint Denis, or Dionysius, of Paris was the same as the Dionysius converted at Athens by Saint Paul; but the number of years intervening between the time of Saint Paul and when Saint Denis was bishop of Paris (about 207 years) is proof that the Areopagite of Athens and the apostle of Paris were not the same person. The most reliable authorities say that Saint Denis of Paris was sent by the Pope to Gaul about 250 A.D. His mission was most successful and many pagans were converted to Christianity. The number of his disciples attracted the attention of the Roman governor who caused the arrest of Denis and several of his companions, among whom were Eleutherius, a deacon, and Rusticus, a priest. The Christians, refusing to denounce Christ and offer sacrifice to the gods, were tortured and put to death. The bodies of Denis, the priest and the deacon were thrown into the Seine. Catulla, a Christian woman, recovered the bodies and gave them burial. Later a church was built over the place where the bodies were interred. Dagobert I built (about 636) here the abbey of Saint Denis. His feast, in the calendar of the Roman Catholic Church, is 9 October. Consult Butler, 'Lives of Saints'; Tailliar, 'Apostolate of Saint Denis' (Amiens 1869); Vereilly, 'Vie de Saint Denis' (Paris 1854).

DENIS, Saint, săn dė-nē, France, a northern suburb of Paris and lying within the lines of forts surrounding the capital. It has numerous manufactories of calicoes and other printed cotton goods, gelatine, candles, saltpetre and soda, and a great annual live stock market, extending for a fortnight. In the latter part of the 3d century a chapel was erected on or near the present site to the memory of Saint Dionysius or Denis, who is said to have been martyred here. For this chapel Dagobert I, in the 7th century, substituted a large basilica, in which he himself was interred, and afterward it was used as the burial place of the kings of France. Changes were made later but under the Abbot Suger the building became most beautiful. The chapel was destroyed during the Revolution and the bodies of the kings put into a cannon pit. Many of the tombs and relics were, however, preserved in the Musée des Petits Augustins. Napoleon's decree of 20 Feb. 1806 made Saint Denis again the burial place of the reigning family of France. Louis XVIII obliterated from Saint Denis all traces of Napoleon's rule; but under Napoleon III the famous architect Viollet-le-Duc effected a magnificent restoration of the ancient building. The present stained-glass windows are all, with one exception, modern. Pop. 71,549.

DENISON, George Taylor, Canadian soldier: b. Toronto, 31 Aug. 1839. He was educated at Upper Canada College and Toronto University, was called to the bar in 1861, and practised law in Toronto, in 1877 being appointed police magistrate of the city. In 1872 and 1873 he was sent to England as commissioner in behalf of immigration. He began his military service in 1855 and was made lieutenant-colonel in 1866; he was in active service in the Fenian raid of 1866 and in the Riel rebellion in the Northwest Territory in 1885. His 'History of Cavalry' (1877) won the first prize offered by the emperor of Russia for the best book on the subject; he has written also 'The National Defenses' (1861); 'Canada, Is She Prepared for War?' (1861); 'The Fenian Raid at Fort Erie' (1866); 'Canada and Her Relations to the Empire' (1895); 'Soldiering in Canada' (1900) and 'The Struggle for Imperial Amity' (1909). He was one of the founders of the «Canada First» party, and through his contributions to periodical literature and public addresses has been known as an earnest advocate of Canada's rights and of the preservation of the unity of the empire.

DENISON, Iowa, city, county-seat of Crawford County, on the Boyer River, and on the Chicago and Northwestern and the Illinois Central railroads, about 100 miles west by north of Des Moines. A business college and a normal school are situated here. There is a flourishing trade carried on in grain, flour and live stock, dairy products and general agricultural produce. The city has a hospital, flour mills, refrigerating and ice plant, creameries, etc. The water-supply system is owned and operated by the city. In 1849, an Indian massacre took place at Fort Purdy, nearby. Pop. 3,133.

DENISON, Tex., city of Grayson County, 70 miles northeast of Dallas, on the Missouri, Kansas and Texas, the Texas Central and other railroads. It is of importance as a railroad centre, and contains shops of four systems, also cotton, cottonseed-oil, and flouring mills, creosote works, handle factory, mattress and felt factory and grain elevators. In 1914, 1,109 persons were engaged in 30 manufacturing establishments, capitalized at $1,052,000; $743,000 was paid in salaries and wages; $1,175,000 worth of materials were used, and the value of the products was $2,069,000. It is the seat of Saint Xavier Academy and Washington School, and has a government building, public library, city hospital and two parks. The union railroad station is also a noteworthy feature. It was settled and incorporated in 1872, owns its waterworks and has the commission form of government. Pop. 14,000.

DENISON UNIVERSITY, an educational institution in Granville, Ohio, founded in 1831, under the auspices of the Baptist Church, and intended at first as a manual training school. The manual training was soon abandoned, and the theological department was dropped in 1870. The Shepardson College for Women, established in 1887, became affiliated with the university in 1900. In 1917 the library contained about 55,000 volumes; the attendance was 710 students; instructors 55.

DENITRIFICATION. See NITRIFICATION.

DENIZEN, in English law, an alien who by letters patent has been constituted a British subject permanently or for a time. A denizen is in a middle state between an alien and a natural-born or naturalized subject. He may take lands by purchase or devise, or derive a title by descent through his parents or any ancestor though they be aliens. No denizen can sit in Parliament or take office, civil or military. The right of conferring denizenship is within the powers of the king and of Parliament, though usually exercised exclusively by the former. In the United States this civil condition is well known in South Carolina, having been created by statute. In natural history, an animal or plant originally introduced into a country or district by human agency, which now maintains itself there without the direct aid of man, is called a denizen of that country or district.

DENMARK (Danish, *Danmark*), northern kingdom of Europe, between lat. 54° 40′ and 57° 45′ N., and long. 8° 4′ and 12° 45′ E. It is composed of a peninsular portion and an extensive archipelago, lying east of it, with a few scattered islands on its west side; and is bounded north by the Skager Rack, which separates it from Norway; northeast and east by the Cattegat and Sound, which separates it from Sweden; east and south by the Baltic; south by the duchy of Schleswig, and west by the German Ocean or North Sea. The peninsular portion is composed of Jutland and measures, north to south, 185 miles with a breadth varying from 40 to 108 miles — its broadest part being from Fornæs Point, lat. 56° 26′ 42″ N., on the east coast, to Nissum Fiord on the west coast. The numerous islands lying east of Jutland are mainly comprised in two groups: first, that of Själland, Seeland or Zealand, including, besides the large island of that name, the small adjoining islands east of the Great Belt, the principal of which are Amager, Langöe, Taröe, Masnedöe, Agersöe, Lolland or Laaland, Falster and Möen, and second, the Fünen or Fyen group, comprising, besides the large island of that name, the neighboring islands west of the Great Belt, including Langeland, Aeröe, Fanöe, Taasinge and others. Besides these, there are the outlying islands of Lessöe and Anholt, in the Cattegat, and Bornholm in the Baltic.

Besides these territories, Denmark possesses the Färöe Islands and Iceland, in the north Atlantic Ocean; Greenland, in the Arctic regions.

Copenhagen is the capital, and among the towns of importance are Aarhuus, Odensee and Aalborg.

The following table gives the main divisions of the country, with their area and population, as well as the total area and population of the whole monarchy, according to the latest official enumeration:

DIVISIONS	Area English sq. m.	Population
City of Copenhagen (Kjöbenhavn) without suburbs	27	506,390
Islands in the Baltic	5,117	1,161,163
Peninsula of Jutland	9,898	1,253,809
Färöe Islands (17 inhabited)	540	19,617
Total	15,582	2,940,979

Previous to 1864 the duchies of Schleswig-Holstein and Lauenburg belonged to Denmark, so that the area of the kingdom was then greater by about 7,360 square miles, the corresponding population being more than a million.

Geology and General Aspect.— Denmark is a very low-lying country, there being no elevation of any consequence throughout the whole kingdom. The greatest height is attained on the eastern side of the peninsula, though even there it never exceeds 550 feet. In respect of geological structure all the rocks belong to the upper series of the Secondary, and to the Tertiary formation, and have been deposited from water in regular strata. The rock most fully developed is the chalk, of which several distinct species have been recognized. The whole west coast is rendered almost uninhabitable by the drift-sand, which has formed an almost uninterrupted line of sterile downs, called *Klitten*, extending from Cape Skagen to Blaavands Hook, a distance of nearly 200 miles. Along parts of the coast of Jutland are extensive flats or plains, which have been wrested from the sea, and which are protected from its encroachments by huge dykes, as in Holland.

Rivers, Lakes, Sea-arms, Ports, etc.— Denmark has no large rivers; the principal is the Guden Aa, which is navigable for part of its course. Less important streams are the Holm Aa, the Lönborg Aa and the Stor Aa. All the others are insignificant streams. There are no rivers in any of the islands, but brooks and streamlets abound. There are a number of lakes, particularly in Jutland, and several in the larger islands; but they are all small. The most remarkable of the physical features of Denmark are its lagoons or fiords, winding inlets of the sea, that penetrate far into the land. The largest of these is the Lymfiord or Liim Fiord, in Jutland, which entering the land in the Cattegat, winds its way quite through the peninsula and is separated from the North Sea merely by a narrow strip of land which storms have ruptured in one or two places. Most of the streams, lakes and coasts of the kingdom are well stocked with fish. Besides these inland seas, the Great Belt separates the large islands of Seeland and Fünen and the Little Belt flows between the latter and the coast of Jutland and Schleswig. Denmark is well supplied with excellent seaports, the most important being Copenhagen, Aalborg, Aarthuus and Randers.

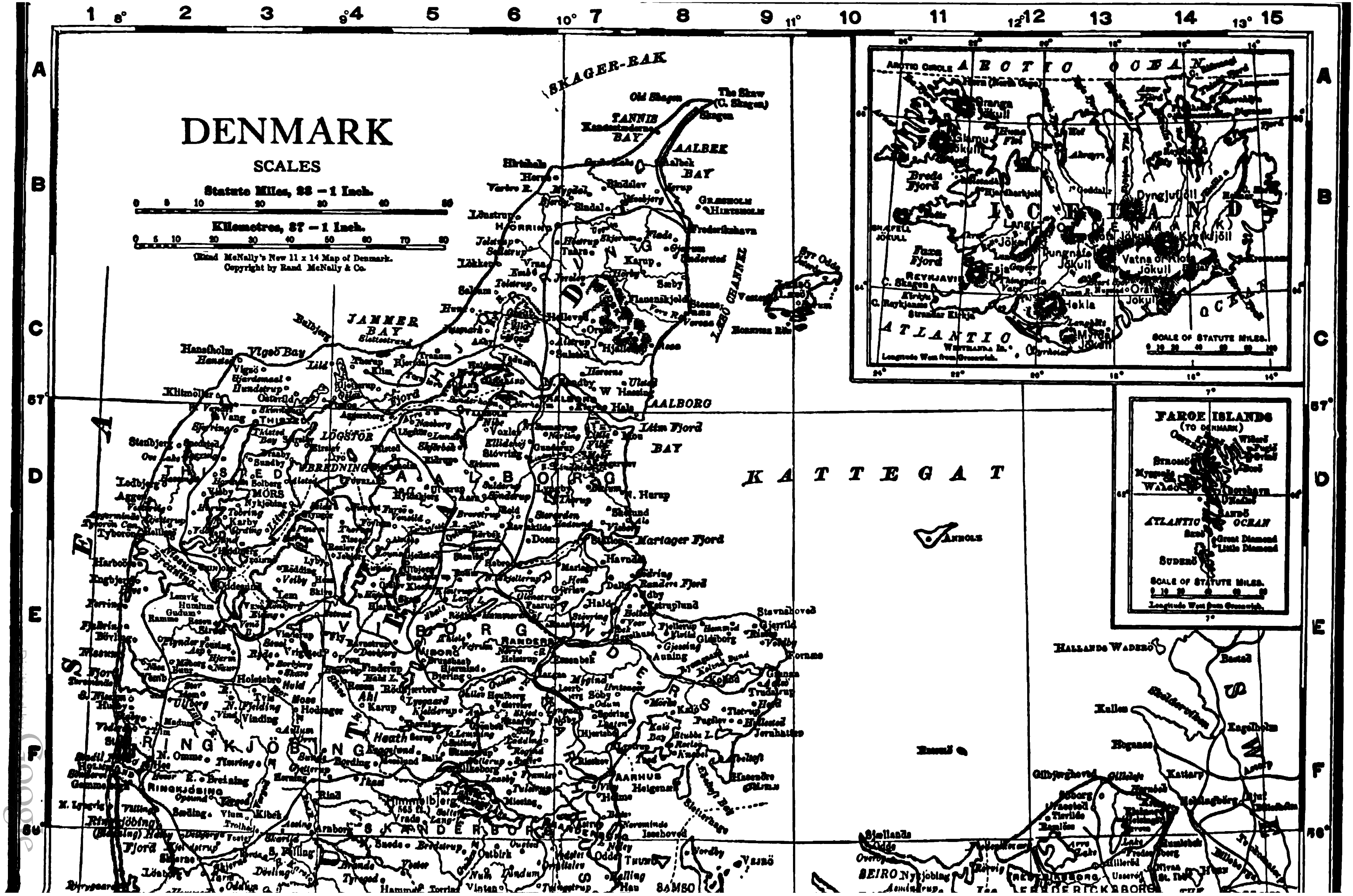
Climate.— The prevailing characteristic of the climate of Denmark is humidity; it is also remarkably temperate for so northerly a region; both the result of the lowness of the land and of its proximity to the sea on all sides. The heats of summer are great, sometimes excessive. The mean temperature of the year is 47°. The shortest day is about 6½ hours, the longest 17½ hours. Heavy rains are frequent in autumn, and mists in summer, especially on the west coast of Jutland. The annual rainfall ranges from 21 to 27 inches.

Animal and Vegetable Products.— Horses and cattle are reared in great numbers, and both are excellent. Large flocks of sheep are kept; but rather for the flesh than the wool, which is coarse and short. Swine are also reared to a great extent. Deer, stags, roes, hares and a variety of other game are met with in the royal and other forests, but do not abound anywhere else. Wild fowl — including the eider-duck, so famous for its down — are numerous. Poultry of all kinds are raised, particularly geese. Potatoes, barley, oats, rye, beans, pease, tares, flax, hemp, madder and tobacco are raised; wheat in Laaland and buckwheat in Fünen. Among the garden fruits are apples, plums, cherries, pears and nuts. Few of the great forests with which the country was once covered now remain. Government, however, has of late years paid some attention to this source of national wealth, and has taken measures for the protection and better management of the forests. The larger forests are now confined to the east side of Jutland and to Seeland.

Agriculture, Cattle-Breeding, etc.— Although not particularly favored by nature, Denmark is yet pre-eminently an agricultural country. Of the total area 80 per cent is productive; about one-sixth of the unproductive area is bog. The land is greatly subdivided, as the law interdicts the union of small farms into larger and encourages the division of landed property. The kinds of grain most largely cultivated are barley, oats, rye and wheat, the greatest area being occupied by oats, the second by barley. Rye is grown throughout the whole peninsula and in the islands of Fünen and Seeland, and some of the islands on the west coast. From this grain the greater part of the bread used in Denmark is made. Wheat, which occupies but a comparatively small area, is grown chiefly on the islands of Laaland and Langeland, and on large estates in other quarters of the kingdom. The yearly yield of the cereal crop is said to be larger than that raised by any corresponding European population except that of Mecklenburg. The oats crop of 1917 amounted to 273,270, the barley crop to 194,660, that of rye to 112,659 and that of wheat to 58,466 tons. Buckwheat is cultivated to some extent in Jutland, as also in the island of Fünen and elsewhere. Potatoes, which were introduced into Denmark early in the 19th century, are now very generally cultivated. Herbage plants and grass are carefully cultivated. Beans, pease and tares are also extensively cultivated throughout the whole country and form an important article of food. Flax, hemp, hops, tobacco, madder, lavender and mustard seed are grown, but not in sufficient quantities to supply the home demand. The part of the kingdom best adapted for the production of fruit is the island of Fünen. Cattle-breeding, grazing and the dairy engage the greatest share of the farmer's attention in Denmark. Large and increasing numbers of cattle are annually exported from the country. A great increase has of late years taken place also in dairy produce, and the export of butter is now the main source of the wealth of Denmark. The rearing of horses is extensively carried on. The old Danish breed is found chiefly in Jutland. Those from the islands are said to be of Tartar descent and are small but strong and active. Sheep-rearing is on the decline in Denmark. Eggs are now largely exported and the rearing of hogs is much attended to; the greatest number are reared in the vicinity of the woods in East Jutland. The rearing of bees occupies a large share of attention, particularly in the island of Fünen, and wax is largely exported.

Fisheries.— The fisheries are an important branch of national industry. Next to the herring the turbot, torsk and salmon are the most abundant sorts of fish. Oyster banks occur on the east coast of Jutland, near its northern extremity, and near the island of Lessöe. Fishponds were at one time very general over the country and were profitable. The seal fisheries of Denmark are considerable. The value of its fisheries in 1916 was $16,053,225.

Manufactures.— These are comparatively insignificant and do not comprise any particular or national manufacture. There are, however, one or two articles which have attained a considerable reputation; these are the woolens and earthenware of Jutland, the former a domestic manufacture; the wooden clocks of Bornholm and a superior kind of stove made in Copenhagen. The manufacture of paper is pretty extensive and has of late years been greatly improved and extended. There are also iron foundries, sugar refineries, some extensive tanneries and many distilleries. Randers in Jutland and Odensee in the island of Fünen were formerly celebrated for the manufacture of gloves; but the peculiar kind of leather from which they were made, and in which their excellence consisted, is now prepared in other countries. The people of Denmark bake their own bread, brew their own beer and spin the greatest portion of the woolen yarn afterward knitted into stockings or woven into cloth by the village weaver. The women make up their own dresses and frequently the clothes of their husbands; the latter make the wooden shoes and slippers and manufacture the greater part of the house furniture and farming utensils. Several of the manufacturing establishments of Denmark belong to the government. Among these establishments are a royal porcelain manufactory in Copenhagen and a royal cloth manufactory in Irsseröd, which supplies cloth for the army. According to statistics gathered on 26 May 1914, there are 82,442 industrial factories and shops in Denmark, employing altogether 346,000 persons, of whom 229,000 were skilled workers. Of the total establishments 15,400 used mechanical power. There were 22 distilleries (5 in Copenhagen) whose output of brandy reduced to 100 degrees, amounted to 2,989,646 gallons. In 1916 there were produced 297,000 gallons of excisable beer and 348,250,000 gallons (small) beer, not excisable. In the same year 137,760 tons of beet sugar were produced at 9 sugar factories and 56,480 tons of margarine in 49 factories.


DENMARK
SCALES
Statute Miles, 28 – 1 Inch.
Kilometres, 37 – 1 Inch.
Rand McNally's New 11 x 14 Map of Denmark.
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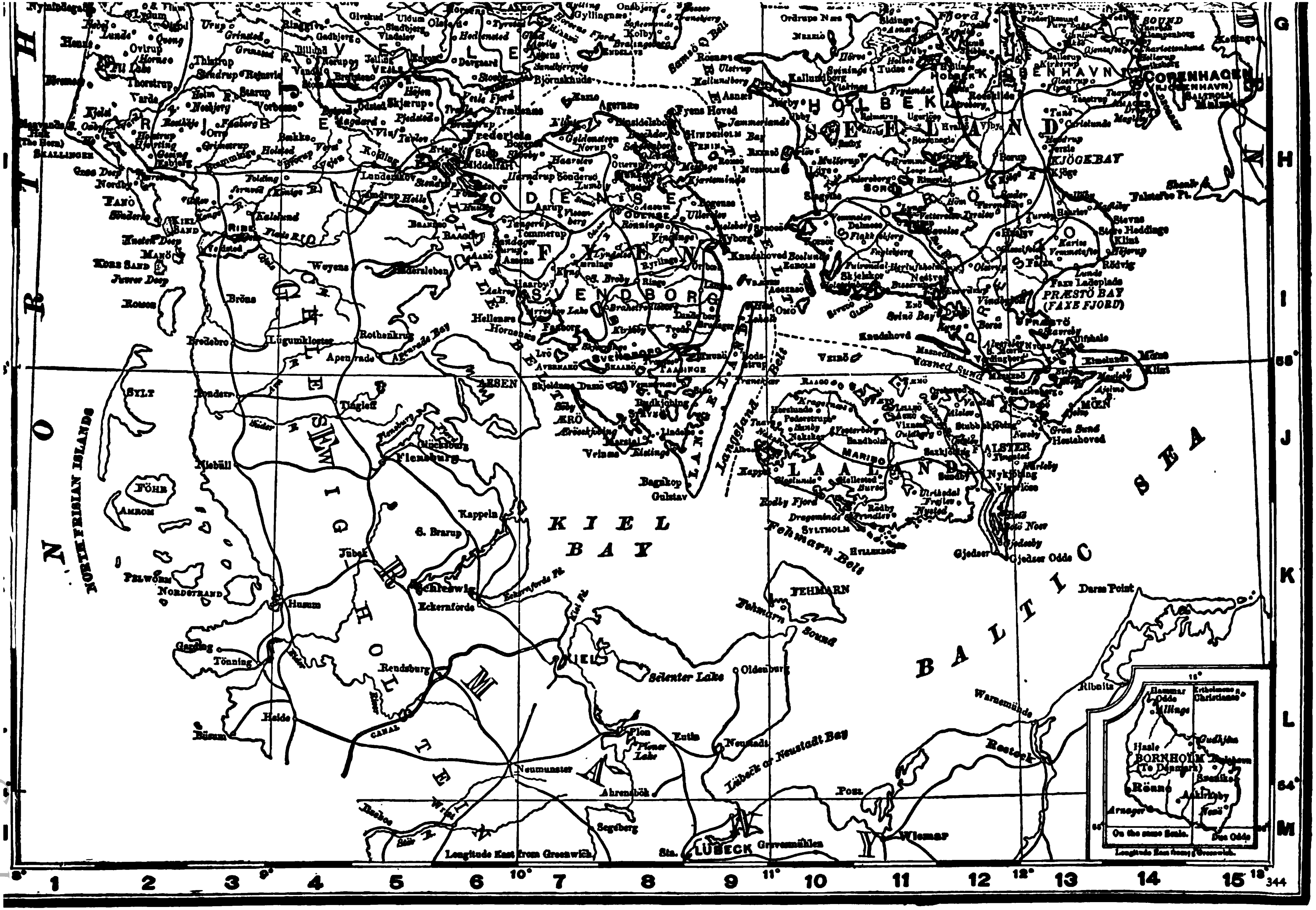
SKAGER-RAK
KATTEGAT
JAMMER BAY
AALBORG BAY
TANNIS BAY
AALBEK BAY
LÆSÖ CHANNEL
Limfjord
Mariager Fjord
Randers Fjord
ANHOLT
HJÖRRING
AALBORG
THISTED
VIBORG
RANDERS
RINGKJÖBING
SKANDERBORG
AARHUS
SAMSÖ
ICELAND (TO DENMARK)
ARCTIC OCEAN
ATLANTIC OCEAN
ARCTIC CIRCLE
REYKJAVIK
Hekla
Vatna or Klofa Jökull
FAROE ISLANDS (TO DENMARK)
ATLANTIC OCEAN
Thorshavn
Strömö
Suderö
Scale of Statute Miles.
Longitude West from Greenwich.
Hallands Wadero
SWEDEN
Helsingborg
Frederiksborg


NORTH
NORTH FRISIAN ISLANDS
BALTIC SEA
KIEL BAY
SOUND
COPENHAGEN (KJÖBENHAVN)
KJÖBENHAVN
HOLBEK
SEELAND
SORÖ
PRÆSTÖ
PRÆSTÖ BAY (FAXE FJORD)
KJÖGE BAY
ODENSE
FYEN
SVENDBORG
LANGELAND
Langeland Belt
Little Belt
MARIBO
LAALAND
FALSTER
MÖEN
Fehmarn Belt
FEHMARN
Fehmarn Sound
VEILE
RIBE
SCHLESWIG
HOLSTEIN
MECKLENBURG
SYLT
FÖHR
AMROM
PELWORM
NORDSTRAND
FANÖ
MANÖ
ALSEN
ÆRÖ
Flensburg
Schleswig
Kiel
Husum
Rendsburg
Neumunster
Lübeck
Wismar
Rostock
Warnemünde
Eckernförde
Oldenburg
Neustadt
Lübeck or Neustadt Bay
Selenter Lake
Ploner Lake
Segeberg
Heide
Tönning
Büsum
Aabenraa
Apenrade
Hadersleben
Fredericia
Kolding
Veile
Horsens
Middelfart
Nyborg
Korsör
Kallundborg
Roeskilde
Kjöge
Vordingborg
Nykjöbing
Gjedser
Gjedser Odde
Dars Point
Ribnitz
Longitude East from Greenwich
BORNHOLM (To Denmark)
Rönne
Hasle
Nexö
Aakirkeby
Hammer Odde
Dueodde
Christiansö
On the same Scale.
Longitude East from Greenwich
G
H
I
J
K
L
M
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
8°
9°
10°
11°
12°
13°
54°
55°

Commerce, Canals and Railways.— The commerce of Denmark is carried on chiefly with Great Britain, Germany (especially Schleswig-Holstein), Norway, Sweden, United States and Russia, Great Britain and Germany possessing by far the largest share. The chief imports are textile goods (especially cottons), metals and hardware, wood and articles made of it, coal, bricks, salt, manure, oil, oil-cake, fish, rice, coffee, fruit, glassware, paper. The principal imports are cotton manufactures, coal and iron. Considerable quantities of cotton are imported by Denmark from Germany. The manufactures of Denmark being, as already mentioned, insignificant, the articles exported consist chiefly of agricultural products. The declared value of the total imports in 1914 amounted to $220,913,330 and that of the exports to $240,957,220. In 1916 the mercantile marine of Denmark consisted of 3,570 vessels, with a total tonnage of 595,252 tons. The coasting trade is extensive and is largely shared in by foreigners. There are several canals in Denmark, but none of them of any great consequence. There are 2,404 miles of railroads, over half owned by the state, running across the islands of Seeland, Fünen, Laaland and Falster, which, assisted by ferries, gives direct communication with the capital on the one hand and with Jutland on the other.

Moneys, Weights, etc.— Since 1 Jan. 1875 the unit of the Danish monetary system has been the *krone* or crown, equal to about 26½ cents. The krone is divided into 100 *öre*. The use of the metric system of weights and measures became obligatory in Denmark in public offices on 1 April 1910, and generally on 1 April 1912.

People, Education, Religion.— The population of Denmark is composed almost exclusively of Danes, with a few thousand Jews and others. The Danes have regular and well-formed features, fair or brownish hair and blue eyes, with muscular frames; they are kind-hearted, honest and simple-minded, and continue to maintain their ancient reputation of being bold and hardy seamen. All classes are noted for their hospitality, which is indeed a characteristic of the nation. At the head of the educational institutions stand the University of Copenhagen and the Holberg Academy at Soröe. Elementary education is widely diffused, although in this regard Denmark is no longer so pre-eminent as formerly; it is compulsory for children between the ages of 7 and 14 years, and the public schools, maintained by communal rates, are, with the exception of a few middle-class schools, free. Of elementary schools there are 3,446 with 400,000 pupils. There are training colleges for teachers, and classical and other higher education is afforded by a large number of colleges in the more important towns, with the University of Copenhagen (1,300 students) for the centre of the entire system. Denmark has also a theological seminary, a royal surgical college, a veterinary and agricultural school, and numerous military, technical and commercial schools, while 71 «people's high schools» provide instruction in agricultural subjects. There are three public libraries in Copenhagen, of which the Royal Library, with 500,000 volumes, is especially rich in Oriental and Icelandic MSS. The established religion is Lutheran, to which the king must belong; but complete toleration is enjoyed in every part of the kingdom. The Reformation was introduced in 1536, when the Church revenues were seized by the Crown. Denmark is divided into seven dioceses, in which there are 1,360 parishes. According to the census of 1911 there were 2,732,792 Protestants, 9,821 Roman Catholics, 256 Greek Catholics, 5,164 Jews and 9,043 other or of no confession.

Government, Army and Navy, Finance.— The government of Denmark is a constitutional monarchy, the king being assisted by a cabinet of 10 ministers. The Crown was elective until 1660, when the people and clergy, impelled by hatred toward the nobles, invested the sovereign (Frederick III) with absolute power, and declared the succession to the throne hereditary. From that time the Crown exercised absolute rule till 1831, when a constitution was granted. This proving unsatisfactory was superseded in 1848 by the form of government which, with some alterations, Denmark now enjoys. The present Constitution of Denmark is founded on the «Gründlov» (charter) of 5 June 1915, which was put in force 1 Jan. 1916. According to this new charter, the executive power is vested in the king and his responsible ministers, and the right of making and amending laws in the Rigsdag, or Diet, acting in conjunction with the sovereign. The king must be a member of the Evangelical Lutheran Church, which is declared to be the religion of the state. The Rigsdag comprises the Folkething and the Landsthing, the former being the popular chamber, the latter a senate. The Folkething consists of 140 members returned in direct elections by universal suffrage for the term of four years. The franchise is enjoyed by all citizens of good reputation, male and female (of an age gradually decreasing from 30 years at present to 25), who are not in receipt of poor-relief. All voters are eligible for election to the house. Of the 140 members the capital has to elect 24 by the list system of proportional representation. Outside the capital 92 members are elected in single-member constituencies by simple majority, and furthermore 23 additional seats are to be allotted to candidates of those parties who have obtained less than their proportional share. The additional seats are to be had by those non-elected candidates having received the most votes. The Lansdthing consists of 72 members. The franchise is enjoyed by all electors to the Folkething, of 35 years of age, and residing in the electoral district. All former privileges for the largest taxpayers have been abolished by the Gründlov of 1915. The election is indirect and exclusively proportional. Fifty-four of the 72 members are elected by the Andra (Hare) method of proportional representation in large electoral districts, mostly embracing 10 to 12 members. The remaining 18 members are to be elected on the principle of proportional representation by the members of the outgoing house. Fifty-four members of the Landsthing are reappointed in two sections, each including about 27, and sitting 8 years. Both the members of the Landsthing and of the Folkething receive payment for their services at the rate of 10 kroner ($2.26) per day. Members must accept payment. The Rigsdag must meet every year on the first Tuesday in October. To the Folkething all money bills must in the first instance be submitted by the government. The Landsthing, besides its legislative functions, has the duty of appointing from its midst every four years judges who, together with the ordinary members of the Höiesteret, form the Rigsret, a tribunal to try parliamentary impeachments. The ministers have free access to both of the legislative assemblies, but can only vote in that chamber of which they are members.

For administrative purposes Denmark is divided into 18 counties (amter), each of which is administered by a governor (amtmand). Moreover, the county is a municipal division with a county council superintending the rural municipalities (about 1,200). There are 77 urban municipalities with a mayor and a town council. Rural as well as urban municipal councils are elected direct by universal suffrage. Copenhagen forms a district by itself, and has its own form of administration. The total revenue in the fiscal year from 1916 to 1917 was $134,388,105; and the expenditure $82,633,085. Since the war of 1866, the government has maintained a comparatively large reserve fund to meet any sudden emergency. That fund in 1917 was $3,182,605. The total national debt is $163,634,870, or about $58 per head of the population; the investments of the state (in telegraphs, etc.) amount to over $301,111,110. The deposits in the Danish savings banks increased from $262,827,000 in 1916 to $298,440,000 in 1917.

The Danish army is a national militia, resembling in some respects the Swiss army. Every able-bodied Danish subject is liable to serve in the army or navy, except the inhabitants of Iceland, and the Färöe Islands. Exemptions in Denmark are few, even clergymen having to serve. Service commences at the age of 20 and lasts for 16 years. For the first 8 the men belong to the active army, and for the second 8 years to the extra, or territorial, reserve. At the time of joining, the recruits are continuously trained for 165 days in the infantry, 280 days in the field artillery, 1 year in the garrison artillery and 200 days in the cavalry. The engineers have 7 months', and the train 2 months' continuous training. In the case of about one-fourth of the men their initial training is prolonged by periods ranging from 2½ to 8½ months, according to the arm of the service to which they belong. Subsequent training for all arms only takes place once or twice in the remaining 6 or 7 years of army service, and then only for 25 or 30 days on each occasion. The peace strength of the active army is about 820 officers and 12,900 men. The navy in 1916 had 3 monitors, 15 torpedo boats, 2 small cruisers, 2 minelayers and 6 submarines. Besides these, there is a nominal fleet of war-craft, but this has little or no fighting power. The navy numbers 4,000 officers and men. The military budget for 1916 amounts to $4,902,465, besides allotments for fortifications, etc.

History.— The early history of Denmark is lost in the twilight of the saga-period, out of which loom dimly the figures of its heroes, their brave deeds and daring voyages. Within its borders the Celts had first their home, and from its shores the Angles and Saxons sailed in the 5th century to the conquest of England; while in their place the Danes from Zealand settled on the deserted lands, extending their sway as far south as the Eider. One of their earliest kings, Harald Hildetand, fell in battle against the Swedes in 695; and shortly afterward a branch of the Ynglinger occupied Jutland, where they held a footing for two centuries. One of their kings, Harald Klak, received baptism in 826 from Ansgar, but the introduction of Christianity did not at once place any check on the long accustomed inroads on Frankish territory, or on the piratical expeditions of the Vikings; although the country was soon torn by dissensions between the adherents of the old and new faiths. Gorm the Old, who drove the Ynglinger from the peninsula, and first united the mainland and islands under one rule, was the bitter enemy of Christianity; and although his death in 936 gave fresh vigor to the diffusion of the new faith, yet even its ultimate success was only ensured by the zealous support it received from Gorm's grandson, Canute. On his death in 1035 the three kingdoms of his Anglo-Scandinavian Empire separated, and his sister's son, Svend Estridsen (1047–76), ascended the throne of Denmark, founding a princely line that flourished 400 years. Internal dissensions and external wars weakened the country, and the introduction of a feudal system raised up a powerful nobility, and ground down the once free people to a condition of serfdom. Waldemar I (1157–82) added Rügen to the other Wendish districts of Mecklenburg and Pomeraia, and extended his sway over Norway also. Under Waldemar II the conquests of Denmark extended so far into German and Wendish lands, that the Baltic was little more than an inland Danish sea. The jealousy of the German princes and the treachery of his vassals combined to rob him, however, of these brilliant conquests, and his death in 1241 was followed by a century of anarchy and inglorious decadence of the authority of the Crown, during which the kingdom was brought to the brink of annihilation. Under his great-grandson, Waldemar IV, Denmark made a transient recovery of the conquests of the older Waldemars, rousing the jealousy of the Hanseatic League, and the national laws were codified. From his death in 1375 to 1412, his daughter, the great Margaret, widow of Haakon VI of Norway, ruled not only that country and Denmark, but in course of time Sweden also, with so light yet firm a hand that for once in the course of their history the three rival Scandinavian kingdoms were content to act in harmony. Margaret's successor, Eric, the son of her niece, for whose sake she had striven to give permanence, by the act known as the Union of Calmar (1397), to the amalgamation of the three sovereignities into one, undid her glorious work with fatal rapidity, lost the allegiance and the crowns of his triple kingdom, and ended his disastrous existence in misery and obscurity. After the short reign of his nephew, Christopher of Bavaria (1440–48), the Danes exerted their ancient right of election to the throne, and chose for their king Christian of Oldenburg, a descendant of the old royal family through his maternal ancestress, Rikissa, the great-granddaughter of Waldemar II. Christian I (1448–81), who was at the same time elected Duke of Schleswig and Holstein, was the founder of the Oldenburg line, which continued unbroken till the death of Frederick VII in 1863. His reign was followed by half a century of international struggles in Scandinavia. The insane tyranny of Christian II cost that monarch his throne and freedom; the Danes chose his uncle Frederick I to be their king, while Sweden was forever separated from Denmark and rose under the Vasas to be a powerful state. See GUSTAVUS I.

Under Christian III (1536–59), the Reformation was established in Denmark. Christian IV after his brief share in the Thirty Years' War proved one of the ablest of all the Danish rulers. His liberal and wise policy was, however, cramped in every direction by the arrogant nobles, to whose treasonable supineness Denmark owes the reverse by which she lost (1658) all the possessions she had hitherto retained in Sweden; and with the relinquishment of these, and consequently of the undivided control of the passage of the Sound, the country's former international importance came finally to an end. The national disgraces and abasement which followed led, in 1660, under Christian's son, Frederick III, to the rising of the people against the nobles, and their surrender into the hands of the king of the supreme power. For the next hundred years, chiefly marked by wars with Sweden, the peasantry were kept in serfdom, and the middle classes depressed; but by the end of the 18th century the peasants had been gradually emancipated, while many improvements had been effected in the mode of administering the laws, and the Danish kings, although autocrats, exercised a mild rule. The miseries of the reign of Frederick VI, who governed as regent from 1784, brought the country to the verge of ruin. Denmark having joined Russia in a compact of the northern powers hostile to England, a fleet was sent into the Baltic and considerable injuries were inflicted by an attack on Copenhagen, in 1801, under Parker and Nelson. From this the country rallied; but in 1807 the British government, suspicious of an intention on the regent's part to violate his neutrality and take sides with Napoleon, demanded the surrender of the entire Danish navy, to be restored at the conclusion of peace. A refusal was followed by the bombardment of Copenhagen in September 1807, and the fleet was given up; but this treatment drove Denmark into Napoleon's arms and with him the kingdom was obliged to co-operate until the close of 1813.

By the Congress of Vienna, Denmark was compelled to cede Norway to Sweden. From this period a spirit of discontent grew up in the duchies, degenerating into mutual animosity between the Danish and German population, which led to an open rupture with Denmark in 1848, immediately after the accession of Frederick VII. (For the whole question, see SCHLESWIG-HOLSTEIN). After alternate hostilities and armistices, the war was virtually concluded in 1850, by the victory of the Danes at Idsted; but in 1863 the quarrel was renewed. On the death of Frederick in that year, Prince Christian of Schleswig-Holstein-Glücksborg ascended the throne under the title of Christian IX, in conformity with the act known as the Treaty of London of 1852, by which the succession to the Danish crown had been settled on him and his descendants by his wife, Princess Louise of Hesse-Cassel, niece of King Christian VIII of Denmark. A pretender, backed by German influence and help, at once started up in the person of the eldest son of the Duke of Augustenborg, who assumed the title of Duke Frederick VIII of Schleswig-Holstein; but his cause was speedily merged and lost sight of by Prussia and Austria in their direct aim of incorporating the duchies with the German Confederation. Denmark, unaided by England and France, allies on whose support she had relied, was forced to go single-handed into the unequal contest. After a brave but utterly futile attempt at resistance, the Danes found themselves forced to submit to the terms dictated by their powerful foes, and resign not only Laurenburg and Holstein, but the ancient Crown-appanage of Schleswig. By the peace of Vienna 1864, the Danish king bound himself to abide by the decision which Prussia and Austria should adopt in regard to the destiny of the severed Danish provinces. The dissensions between these two great powers, which led to the Austro-Prussian War of 1866, resulted in the triumph of Prussia, and since then the duchies have remained an integral part of that state. Since the war, Denmark, although reduced to the narrow limits of the islands and Jutland, has recovered from its fall, and has greatly prospered, in spite of the spread of socialistic opinions, and the political dissensions that have ranged the government and Landsthing, supported by the press of the capital, against the Folkething and majority of the people.

In 1870 war broke out between Germany and France and an alliance was formed between France and Denmark, with a view to the protection of the latter from German aggression. The result of the war was the downfall of the French Empire; this treaty was dissolved, and Denmark felt that her safety lay in a strict neutrality. Yet the resentment of the country toward Germany was by no means allayed, and the general population were indignant that so many leading politicians were anxious to draw closer the lines that bound Germany and Denmark together. This indignation frequently broke out into such violent manifestations that at least it became evident that anything like a close alliance and understanding between the two states seemed impossible.

The 5th article of the treaty made between Austria and Prussia (23 Aug. 1866) had given to Denmark some prospect of recovering the northern districts of Holstein. There arose, however, considerable discussion with Prussia about the realization of this hope, and Prussia seemed reluctant to give any guarantee for the restoration of the territory. So long as the Emperor Napoleon was in power, this article, which he had not only suggested, but had maintained and advocated, the hope of Denmark for the surrender of North Schleswig appeared reasonable. After the catastrophe of Sedan (1870) this hope was forever abandoned. The French Republic took no interest in Schleswig, Italy was equally indifferent, England was occupied in other matters and had learned in the Crimea to shun all meddling with other people's quarrels. The rage of the Danes was roused in 1879 on learning that Germany was discussing with Austria the abolition of Article 5 in the treaty, and even the Danish court, by the marriage of the Princess Thyra, in 1878, with the Duke of Cumberland, whose dislike for the Germans was well known, had shared, by anticipation, in this expression of feeling. This national sentiment of the Danes took almost a warlike character. In the Rigsdag, 1873, legislative measures were proposed for the reorganization of the land and sea forces and the fortification of Copenhagen. The ruling party in the Folkething strongly advocated an increase in the army and navy, and an improvement in the coast fortifications; this was advisable as a demonstration of power which would be of effect in the case of war between other nations, but would also secure Denmark against the encroachments of Germany. The representatives of rural constituencies or Agrarians, however, together with the Radicals, were opposed to an active policy on the part of Denmark. The Conservatives, with the sympathy of King Christian, were for warlike preparations, by the increased national defenses.

In 1874 the Liberal party, under Fonnesbech, succeeded Holstein-Holsteinborg's Conservative Cabinet, which had been in power since 1870, but even the Liberals failed to overcome the opposition which the Folkething persisted in showing to the proposed expenditure on the military and naval forces. The king therefore called into office a ministry of a purely bureaucratic character, which he had counseled Estrup to appoint. Jacob Brönnum Estrup was a remarkable man. When he took his seat in the Landsthing in 1864, he appeared as leader of the Agrarians, and showed both power and patriotism in his political career, and did much for the advancement of Danish constitutionalism. His desire always was to render Denmark's place among the Powers secure and independent, to develop its resources, and especially to secure for his country adequate protection in the carrying trade of the world's commerce. The king had found in him a man ready to carry out his wise designs for the little realm. In 1866 he had been a leading spirit in the revision of the constitutional code of Denmark, and he strongly advocated the view of the Conservatives that the Folkething, or lower house of the Rigsdag, had not, like the English House of Commons, the sole right to make appropriations from the public treasury. The Radicals of the Folkething, however, claimed supremacy in all matters of taxation and finance, and formed the Left in that assembly. On the other hand, the king and Landsthing, or upper house, according to the Conservatives, had constitutionally the right of overruling the Folkething. Estrup was on the side of those who would not trust the lower house with the sole control of the exchequer. The government, he maintained, was threefold,—king, Landsthing and Folkething; where any two of them were united against the third, the majority ought to be paramount in deciding the issue. From the time Estrup was appointed Minister of Finance and president of the Council, the clash of parties increased day by day; Estrup again and again brought forth his measures of warlike preparation; again and again were they defeated. In the Folkething the opposition majority increased with every division. In 1876 this party had 74 members as against 27 supporters of the government. It threw out the budget of Estrup, and the government was compelled to beat a retreat, although the fortification of Copenhagen went forward. This brought about a crisis in political affairs and also led to a new development in the constitution. Estrup stood his ground and was supported by the press as well as by the public opinion of the capital. He maintained that, according to the parliamentary system of Denmark, he had it in his power to propose a provisional finance measure; that such a measure could be carried by the Landsthing, the upper house, which controlled the Folkething. The measure was carrried with the approval of the king, and the fortifications at Copenhagen were on their way to be completed. In 1880 two measures were passed for the increase of the army and navy. The opposition thereupon began what was known as the «Verdorrungspolitik,» «The policy of blight,» i.e., obstruction. Not only did they oppose the finance measures of the government, but every measure, of whatever kind, proposed by Estrup's party and sanctioned by the Landsthing, they threw out. But the king and the ministry remained firm, and were supported by a large majority of the population of the country. The fortification of Copenhagen was completed with the assistance of volunteer contributions to the amount of $253,333.33. The financial prosperity of the country was evident. The appropriation made for land defenses amounted to $10,033,333.33; the department of railways had expended $17,733,333.33. There was still a large balance in the treasury. The history of Denmark from that time is a history of parliamentary struggle. The Moderates of the Left could not keep pace with the violence of the Radicals, and in 1891 an actual rupture took place. The Moderates desisted altogether from the «policy of blight,» or obstruction, and drew nearer and nearer to the Conservatives. The consequence was that the Radicals lost their supremacy in the Rigsdag, and in the elections of April 1892 forfeited many seats. The opening speech of the Prime Minister in the Folkething (1892) outlined a policy which was not long in being carried out. The Moderate Lefts supported a measure for land defenses; the fortifications projected were quickly finished, and the triumph of the Conservatives was complete. This was shortly before the resignation of Estrup in 1894. But the fluctuations of parliamentary life in Denmark were not yet complete. The dispute indeed seemed interminable. The Landsthing and the ministry stood on one side, a majority of the Folkething on the other. This majority in the lower house gradually completed the rupture which had been threatened during the debates on land defenses, and seemed at last rent asunder permanently into Radicals and Moderates. In August 1899 M. Hörring became Premier. The Radicals had been gathering strength since the retirement of Estrup and the absence of his firm hand and clear judgment had imperiled the tranquillity of the political voyage in Denmark. In 1900, however, the new Conservatives rallied their strength, and a Cabinet was formed by one of their number, M. Sehösted, who, after a stormy experience, resigned in 1902, when the Radicals won an overwhelming victory at the polls and a Radical administration, under Professor Deuntzer, came into power. After the elections of 1915 the Landsthing contained 5 Free Conservatives, 22 Right (Conservatives), 26 Left, 6 Radicals and 4 Socialists. The Folkething, elected May 1915, contained 42 Left, 27 Radical Left, 32 Socialists, 8 Right (Conservatives), and 5 Independents. On 29 Jan. 1906 the aged Christian IX died. He was succeeded by his son Frederick VIII, whose second son Charles had been elected in the preceding year to the throne of Norway as Haakon VII. On 14 May 1912, Frederick died suddenly in Hamburg, while traveling incognito, and the body remained unidentified for some time in the public morgue. His son succeeded as Christian X. In the year following his accession he was shorn of some of his powers by the Folkething, which in the same session granted suffrage to women.

The prosperity of Denmark has greatly advanced since its dismemberment in 1864, and the increase in its trade has been remarkable. In 1915 the merchant steam fleet included 3,564 vessels of 589,873 registered tons. These form a part of the great tramp fleet that plies between Europe and America. The trade between Denmark and the United States has especially shown a healthy growth, the imports from the United States to Denmark for 1914 being $21,073,000, while the United States imported from that country goods to the value of $2,915,250. This growth of trade between the two countries has been rapid, for the route from Copenhagen to Newport News and Norfolk, Va., was only opened up in 1898. The six Danish steamers engaged on this route also run to New Orleans and carry American goods to all the principal Baltic ports. The New York route has several large steamers built since 1898. The Danes emigrate in considerable numbers to the United States and generally settle in the agricultural districts of the West, notably in Illinois. Returns for 1914 give 6,262 as the extent of Danish immigration to the United States. Agriculture has been developed in the peninsula to a remarkable degree during the past few years, and dairy produce manufactured with the aid of steam machinery has shown a proportionate increase. There are about 900 steam dairies in Denmark. The sanitary precautions taken by government in the inspection of cattle are more thorough perhaps than anywhere else in the world.

The Danish West Indian possessions have recently become territories of the United States. These comprise Saint Croix, the largest of the Virgin Islands, Saint Thomas, a smaller island further south, and Saint John, to the east of Saint Thomas. Their united area is 118 square miles. The proximity of these islands to Porto Rico and their importance as stations in the trade routes of the Caribbean Sea adds to their desirability as United States possessions. There was expressed for many years a willingness by Denmark to transfer these islands, and the question was brought up afresh in 1902, when a treaty, providing for the sale of the Danish West Indies to the United States for $5,000,000, was signed at Washington by President Roosevelt, 14 January, and ratified by the Senate, 17 February. This was considered to have settled the question finally, but 23 April of the same year the Danish Landsthing passed a resolution postponing a decision as to the sale, until the electors qualified to send members to the Colonial Council should be consulted. The sale was not to be ratified until these electors should approve the cession. The Folkething went even further than this, and refused to ratify the sale, unless the inhabitants of the islands, who are mostly free negroes engaged in the cultivation of the sugar cane and number 35,156, declared in favor of the transfer by a plebiscite. The matter was thus naturally referred once more to the Landsthing, and when the matter came before that body (22 October) their decision was regarded as adverse to the bill. As the Premier reminded the Council, it would be necessary to put out more capital in the islands unless they were sold, and accordingly the West Indian Co., with a capital of $1,000,000, was formed at Copenhagen three days after the decision of the Landsthing. Trade between Denmark and these three islands had been steadily decreasing for some years, and the Danish government in 1902 appointed a commission to proceed to the islands and report on measures for improving their commercial condition. In Feb. 1917 Congress of the United States appropriated $25,000,000 for the purchase of the islands and fixed the form of government. The formal transfer of the islands took place a few weeks later. See DANISH LANGUAGE; DANISH LITERATURE; VIRGIN ISLANDS.

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DENNER, Balthazar, German portrait painter: b. Altona, 15 Nov. 1685; d. Rostock, 14 April 1749. He was painter to several courts, executing portraits of princes and dignitaries, and was noted for his extraordinary minuteness of finish. Among his works are 'Head of an Old Woman'; for which Charles VI paid 4,700 florins; and 'Head of an Old Man,' both in the Vienna Museum; and many canvasses in other famous galleries.

D'ENNERY, Adolphe Phillipe. See ENNERY, ADOLPHE PHILLIPE DE.

DENNEWITZ, dĕn'nĕ-vĭts, Germany, village in the province of Brandenburg, Prussia, famous for the battle between the French and Prussians, 6 Sept. 1813, the former commanded by Ney (under whom were Oudinot, Bertrand, Reynier and Arrighi), the latter by Tauenzien and Bülow. Forty thousand Prussians maintained their ground for several hours against 80,000 French; and on the arrival of the Russian and Swedish battalions victory declared in favor of the allies, who, after the Russians and Swedes came up, were far superior in numbers. The French were defeated, and fled in disorder, leaving behind them on the field of battle 15,000 in killed, wounded and prisoners and 43 pieces of ordnance. The allied, mostly Prussian, losses totaled about 9,000. A point well deserving of notice in connection with this victory was the fact that it was due to the valor of the Landwehr (militia) troops, whose fighting qualities Napoleon had disdained.

DENNEY, James, Scotch theologian of the United Free Church: b. at Paisley, 5 Feb. 1856. He received his M.A. at the University of Glasgow in 1879, and his B.D. from the Free Church College of Glasgow in 1883. He was minister of East Free Church, Broughty Ferry, 1886–97. Since 1897 he has been professor of New Testament language, literature and theology in the United Free Church College of Glasgow. He is the author of ‘The Epistle to the Thessalonians’ (1892); and ‘The Second Epistle to the Corinthians’ (1894, both in ‘The Expositor's Bible’); ‘Studies in Theology’ (1895); ‘The Epistle to the Romans’ (in ‘The Expositor's Greek Testament,’ 1900); ‘The Death of Christ’ (1902); ‘The Atonement and the Modern Mind’ (1903); ‘Jesus and the Gospel’ (1908); ‘The Way Everlasting’ (1911); ‘War and the Fear of God’ (1916).

DENNEY, Joseph Villiers, American educator: b. Aurora, Ill., 9 Jan. 1862. He was graduated at the University of Michigan in 1885, and afterward studied law, taught for a year at the University of Michigan and from 1891 to 1894 was associate professor and from 1894 to 1904 professor of rhetoric at the Ohio State University. In 1908 and in 1911 he lectured at Columbia University. He is author of ‘Burke's Conciliation Speech’ (1898); ‘Macaulay's Warren Hastings’ (1907); ‘American Public Addresses’ (1909); ‘Four Idylls of the King’ (1911); ‘Washington, Webster, Lincoln’ (1911); ‘Argumentation and Debate’ (1911); and in collaboration with Fred N. Scott ‘Paragraph Writing’ (1893); ‘Composition-Rhetoric’ (1897); ‘Elementary English Composition’ (1900); ‘Composition Literature’ (1902); also with Charles H. Johnston ‘High School Education’ (1912); with S. B. Tobey, ‘An English Grammar’ (1913), and contributions to the educational press on language training and rhetorical theory.

DENNIS, John, English dramatist and critic: b. London 1657; d. 6 Jan. 1734. In 1697 he produced a comedy entitled ‘Plot and No Plot,’ which was followed by several dramatic pieces and poems of little value. He also became a political writer for the Whig party. The irritability of his disposition, heightened probably by the unprosperous state of his finances, involved him in perpetual broils, and made him a sort of standing jest with the wits of his time. He wrote some severe strictures on Addison's ‘Cato’ and Pope's ‘Rape of the Lock.’ Pope in return gave him a place in the ‘Dunciad,’ and in conjunction with Swift produced a sarcastic tract entitled ‘A Narrative of the Deplorable Frenzy of Mr. John Dennis.’ In his old age his necessities were relieved by a benefit at the Haymarket Theatre, to which his former antagonist, Pope, contributed a prologue. The most important of his critical essays is his ‘Advancement and Reformation of Modern Poetry’ (1701). Consult Paul, H. G., ‘John Dennis: His Life and Criticism.’

DENNIS, Louis Munroe, American chemist: b. Chicago, 26 May 1863. In 1885 he was graduated from the University of Michigan, and afterward studied at Munich, Dresden and Wiesbaden. From 1887 to 1889 he was instructor, 1891–93 assistant professor and after 1900 professor of inorganic and analytical chemistry at Cornell University. He is head of the department of chemistry since 1903. He has published ‘Chemical Problems in Inorganic Chemistry’ (1890); ‘Elementary Chemistry’ (1902), with Frank W. Clarke; ‘Laboratory Manual of Elementary Chemistry’ (1902), with same; ‘Manual of Qualitative Analysis’ (1902), with Theodore Whittlesey; ‘Gas Analysis’ (1913). He is translator of Walther Hempel's ‘Methods of Gas Analysis’ (1902), and contributes frequently to American and German chemical journals.

DENNIS, William Cullen, American lawyer: b. Richmond, Ind., 22 Dec. 1878. He was graduated at Earlham College in 1896, and from Harvard Law School in 1901. In 1902–04 he was assistant professor of law at the University of Illinois, at Stanford University 1904–05, at Columbia 1905–06 and professor of law at George Washington University 1906–09. From 1906 to 1910 he was assistant solicitor of the Department of State. In 1909–10 he was United States agent before The Hague Tribunal in the United States-Venezuela arbitration case; he was again agent of the United States in the Chamizal case with Mexico before the International Boundary Commission 1910–11, and was secretary to Chief Justice White in the Costa Rica-Panama Boundary Arbitration 1911–14, and engaged in private practice at Washington after 1911.

DENNISON, Walter, American educator: b. Saline, Mich., 9 Aug. 1869. He was graduated at the University of Michigan in 1893. In 1894–95 he studied at Bonn University. He was instructor in Latin in the University of Michigan in 1897–99, professor of Latin and Roman archæology at Oberlin College 1899–1902, and junior professor of Latin at the University of Michigan 1902–10, and since 1910 professor of Greek and Latin at Swarthmore College. In 1908–09 he was professor of Latin at the American School of Classical Studies at Rome. He wrote ‘A Junior Latin Book,’ with John C. Rolfe (1898); and he also edited ‘Livy, Book I and Selections from Books II-X’ (1908). He revised ‘Kelsey's Topical Outline of Latin Literature’ (1899) and ‘Frieze's Virgil's Æneid’ (1902).

DENNISON, William, American statesman: b. Cincinnati, Ohio, 23 Nov. 1815; d. Columbus, Ohio, 15 June 1882. He was graduated at Miami in 1835 and became a lawyer, being elected to the Ohio legislature in 1848. He became governor of Ohio in 1860, and rendered invaluable aid to the Union cause throughout the Civil War. President Lincoln appointed him postmaster-general in 1864, an office he retained under President Johnson, resigning in 1866. Dennison College owes much to his liberality.

DENNISON, Ohio, village in Tuscarawas County, 100 miles northeast of Columbus, on the Pittsburgh, Cincinnati, Chicago and Saint Louis Railroad, and on the Panhandle Ohio Canal. It contains a public library and a hospital and has sewer-pipe works and railroad shops. The government, under the Ohio law of 1902, is administered by a mayor and council. Pop. 4,008.

DENNY, George Hutcheson, American educator: b. Hanover County, Va., 3 Dec. 1870. He was graduated at Hampden-Sidney College in 1891. He taught at Pantops Academy, Charlottesville, 1892–96 and from 1896 to 1899 was professor of Latin and German at Hampden-Sidney College. He came to Washington and Lee University as professor of Latin in 1899, became acting president in 1901, and was president from 1902 to 1911 when he was made president of the University of Alabama. He is chairman of the Rhodes Scholarship Committee for Alabama and president of the Alabama State Board of Arbitration since 1912. He has received the following honorary degrees Ph.D. from the University of Virginia 1896, and LL.D. from Furman University 1903, Washington College 1905, Tulane 1912, Washington and Lee 1913 and D.C.L. from the University of the South in 1914. He wrote 'The Subjunctive Sequence After Adjective and Substantive Predicates and Phrases' (1896). He contributed to the 'Library of Southern Literature' on the South in the 'Building of the Nation.'

DENON, dė-nôṅ, **Dominique Vivant**, BARON DE, French artist, diplomatist and author: b. Châlons-sur-Saône, 4 Feb. 1747; d. Paris, 27 April 1825. He studied law and drawing with Hallé. He was attached to embassies at Petrograd, Switzerland and Naples, successively. At Ferney, Switzerland, he painted the portrait of Voltaire and drew the well-known picture 'Déjeûner de Ferney.' At Naples he took advantage of the opportunity to collect old masters and make portraits; and with the Abbé Saint-Non wrote 'Voyage pittoresque de Naples et de Sicilie' (1788)). Becoming acquainted with Bonaparte, he accompanied the general in his campaigns to Italy and Egypt, and Desaix to Upper Egypt. The work which was the result of his journey, 'Voyage dans la Basse et la Haute Egypte,' was issued in 1802. When he returned to Paris with Bonaparte he was appointed inspector-general of the museums and all the works of art executed in honor of the French successes — monuments, coins, the erection of the triumphal pillar in the Place de Vendôme, etc. He accompanied Napoleon in all his campaigns, and employed himself in drawing and in selecting those masterpieces in the conquered countries, which were taken to Paris as trophies. After the abdication of the emperor he retained his office, but was deprived of it in 1815, in consequence of having joined Napoleon on his return from Elba. He retained, however, his place in the institute. From that time he lived retired, and the preparation of engravings and lithographs of his splendid collection of works of art formed the occupation of his last years. In 1826 appeared at Paris the 'Description des objects d'art composant le cabinet de feu M. le Bar. V. Denon.' In 1872–73 his etchings were published with an introduction by La Frizelère.

DENS, Petrus, author of a manual of Catholic theology: b. Boom, Belgium, 1690; d. Mechlin, 15 Feb. 1775. He is noteworthy only as the reputed author of a manual text-book of Catholic theology, 'Theologia Moralis et Dogmatica' (Moral and Dogmatic Theology). His work was published under his name by the professors of Mechlin and probably contained much of Dens' teaching. It is still used, with modifications, by the professors of Mechlin. He was a professor in the diocesan seminary of Mechlin and during 40 years was president of the institution. He was also honored with several offices of importance in the diocese of Mechlin — pastor of the metropolitan church there, president of the seminary, canon penitentiary, synodical examiner and archpriest of the chapter. He wrote treatises on penance, on the virtue of religion and several tracts.

DENSITY, a term denoting the mass per unit of volume in a body. (See SPECIFIC GRAVITY). The density of the earth has been determined as about 5.527. See GRAVITATION.

DENT, Frederick Tracy, American soldier: b. White Haven, Mo., 17 Dec. 1820; d. Denver, Col., 24 Dec. 1892. He was graduated from the United States Military Academy at West Point in 1843 and served in the Mexican War, being engaged in the siege of Vera Cruz and the battles of Churubusco and Molino del Rey. He took part in the Yakima expedition (1856), in the Spokane expedition and in the Snake River expedition (1860). During the Civil War he commanded a regiment in the Army of the Potomac in 1863; was stationed in New York in September 1863, where riots were feared, and was Grant's aide-de-camp throughout the Richmond campaign. He was secretary to President Grant during his first administration. He retired from active service in 1881 with the rank of brigadier-general in the regular army.

DENT, John Charles, Canadian author: b. England 1841; d. 1888. He came to Canada in early life and was called to the bar of Upper Canada. Returning to England, he engaged in journalism; afterward pursued that vocation in Boston, Mass., and in 1870 joined the staff of the Toronto *Globe*. He was the author of 'Canadian Portraits' (1880); 'Last Forty Years' (1881); 'Upper Canada Rebellion' (1885).

DENTAL CORPS, a branch of the United States Army established by the act of 3 March 1911. It consists of dental surgeons and acting dental surgeons, in all not more than one to each 1,000 enlisted men in the army. The number of dental surgeons is limited to 60. Acting dental surgeons have a status similar to that of contract surgeons (q.v.). They must be graduates of a standard dental school and are appointed by the Surgeon-general after a physical examination of the same standard as that required for a commission in the medical corps of the army and a mental examination involving oral and written questions and clinical work. The dental surgeons, who rank as first lieutenants, are appointed from among those acting dental surgeons who have served for three years with a clear record. The physical examination is given over again, and a new professional examination, consisting of a written and a practical part, must be passed. Officers of the Dental Corps rank next below officers of the Medical Reserve Corps, and their right of command is limited to the Dental Corps.

DENTAL FORMULA. See TEETH.

DENTALIUM, a genus of mollusks of the class *Scaphopoda,* the shell of which, about two inches long, is shaped like an elephant's tusk. These mollusks, called tooth-shells, bury themselves uprightly in the sand, and capture their food, which mainly consists of foraminifers, by means of their tentacles. Several species are known in various parts of the world, one of which, common on the northwest coast of America, was valued by the Indians as an ornament for clothing, and strings of it served as money among them. This shell, when used as money by the Indians, was called *hiqua,* and the shell is often called hiqua-shell..

DENTARIA, pepper-root, a genus of plants of the natural order *Cruciferæ.* There are about 15 species, natives of temperate countries, of which 11 are found in America. They are ornamental herbs, with creeping singularly toothed root-stocks, from which they receive the names of pepper-root and toothwort. The stem-leaves are opposite or in whorls of three and the flowers are white or pink. The American species extend from Nova Scotia to Florida and west to Minnesota and Louisiana. The best-known is the pepper-root, crinkle-root or toothwort (*D. laciniata*). The common names refer to the pungent and tooth-like divisions of the root, which is, in some localities, ground and used like horseradish.

DENTATUS, Manius, or **Marcus, Curius,** Roman statesman, flourished in the first half of the 3d century B.C. His first office was tribune of the people, in which he distinguished himself by his opposition to Appius Claudius Cæcus, who, in defiance of law, refused to accept any votes for plebeian candidates. In 290 B.C. he was consul with P. Cornelius Rufinus, and by his decisive victories over the Samnites terminated a war which had lasted for 49 years. He then marched against the Sabines and was again successful in restoring them to the Roman protectorate. In 283 B.C. he became prætor and in 275 B.C. he was again consul, and near Beneventum defeated King Pyrrhus. The triumph which followed was one of the most magnificent which had ever been witnessed. In 274 B.C. he was a third time consul, and after terminating the war with the Lucanians, Samnites and Bruttians, retired to his Sabine farm and spent the remainder of his life in cultivating it. In 272 he became censor, and in that year he built an aqueduct, the Aniensis Veto, which carried the water from the river Anio. He was noted for his great simplicity and frugality as well as for his military and executive achievements.

DENTEX, a genus of acanthopterous fishes near the perches. One species (*D. vulgaris*), the *Dentex* of the ancient Romans, abounds in the Mediterranean, and has occasionally been taken on the southern shores of Great Britain. It is voracious, and has large, sharp teeth. It is sometimes seen three feet in length and 20 to 30 pounds in weight. Great numbers are taken in the mouths of rivers in Dalmatia and the Levant, where they are cut in pieces and packed in barrels with vinegar and spices, just as the ancients used to treat them.

DENTIFRICE (Lat. *dentifricium,* a tooth-powder, *dens,* tooth, *fricare,* to rub), any preparation, liquid or powder, for the purpose of cleaning the teeth. Chalk, precipitated, is generally the base of most of the dentrifrices on the market. For detergents, charcoal, cuttlefish-bone or pumice are sometimes incorporated with the milder principle. Bleaching salts and acids find their way in many market preparations, constituting a grave danger to the tooth structure. Astringency is acquired by using catechu, cinchona and rhatany; myrrh gives odor; peppermint is used to make the taste pleasant; bole armeniac to color the pastes. A few drops of any of the standard antiseptics added to water will often prove an efficient cleanser aided by the friction of the brush.

DENTILS, in architecture, the little cubes or small squarish blocks resembling teeth, into which the square member in the bed-molding of an Ionic Corinthian, composite and occasionally a Roman Doric cornice is divided. Their breadth should be half their height and the metoche (interval) between them two-thirds of their breadth.

DENTIN, or **DENTINE,** dĕn'tĭn, the bone-like structure constituting the body of a tooth, which in the crown portion is covered by enamel and in the root portion by the *crusta petrosa* or cementum. See TEETH.

DENTISTRY. Dentistry may be defined as being a special department of the science and art of healing; embracing a knowledge of the structure, physiology and pathology, and the therapeutic, surgical and mechanical treatment of the tissues of the mouth and its contained organs, also a knowledge of the materials used and their manipulation in the restoration of the dental and oral structures. The early history of dentistry is so closely interwoven with that of medical science that it is impossible to distinguish it from its mother science. The Babylonians, Egyptians, Assyrians, Hebrews, Hindus, Greeks and Romans were the early cultured inhabitants of whom historical records exist. The recent excavations in Babylon have brought to light some interesting facts concerning the practice of dentistry under King Hammurabi, at about 2250 B.C. The law stated that «if one knocks out a tooth of one of his caste, his own tooth shall be knocked out, while, if it is the tooth of a freeman, he pays one-half mine silver.» The Egyptian medical history is principally recorded in the various papyri, especially those deciphered by Ebers and Brugsch, which probably cover the period of 3700 to 1500 B.C. The Egyptian physicians were largely specialists, and it is very probable that some were selected to look after the welfare of the teeth. Most of the dental remedies found in the papyri consist of pastes, powders, plasters, decoctions, etc., in which Saint John's bread, sage seed, honey and some unknown plants play important parts. The treating of abscesses, caries and loose teeth seems to have been known. The Hindus were apparently very proud of their teeth. It is recorded that the use of tooth powders and washes, and especially the use of the tooth cleaner, «rinacarya,» were necessities of their daily toilet. As a toothpick they employed a bitter tasting wood, which, when chewed, produced a fibrous bundle, which was then used as a brush for the gums and the teeth. The aborigines of the western coast of Africa are still using the wood of the sissako and the molungo tree for such purposes and a toothbrush of this very same nature has been recently introduced in the United States, in Great Britain, etc. In the writings of Hippocrates and Pliny frequent allusion is made to drugs which were especially advocated for diseases of the teeth and the mouth. With the simpler remedies as hyssop, licorice, dog's milk, goat's butter, etc., many disagreeable substances, especially of the animal kingdom, were recommended. In Pliny's writings we find, among other dental suggestions, that "if one wishes to be free from toothache, one should eat a whole mouse twice a month." The ancient writings on dental therapeutics contain so many conflicting statements relative to the sources of specific medications that it is extremely difficult to reach an unbiased decision regarding their origin. Plagiarism was of common occurrence among the early scribes; it was, however, not looked upon as a breach of literary etiquette in the same sense of the word as we interpret this term to-day. As an illustration, may be cited Pliny (79 A.D.), who in his famous 'Naturalis Historia' prides himself on the fact that he is able to present excerpts of nearly 100 writers and their 2,000 works. He is honest enough, however, to name these authors, while many of his colleagues of this and a later period prefer silence on this point. Even the renowned Galen (131–200 A.D.) owes most of his botanical knowledge as presented in 'De simplicium medicamentorum' to the materia medica of Dioscorides, which he duly acknowledges. Again, the seven books of Paulus Ægineta (about 600 A.D.) are primarily compilations culled from Galen and Oribasius (about 360 A.D.). The dental therapeutics as presented by the more important Greco-Roman writers — Galen, Oribasius, Celsus, Aurelianus, Paulus Ægineta, etc., the Arabo-Persians — Rhazes, Ali Abbas, Abulcasis, Avicenna and Mesue; the early Germans — Schenck von Grafenberg, Heinrich von Pfolsprundt and Ryff; the early Italians — Arculanus and Vigo; and the early French — Guy de Chauliac, Valescus, Paré and Houillier — all, in their final analysis are culled from Dioscorides. Especially Avicenna (980–1037), "the prince of Arabian Physicians," as he has been styled, and whose treatise on general medicine — the 'Canon' — for many centuries enjoyed equally as high a reputation as did the works of Galen, and to-day is still to be found in many homes of Asiatic Turkey, has been a flagrant plagiarist of Dioscorides' dental medicine. And Walther H. Ryff (1500–72), that "jack-of-all-trades" to whom Hæser refers as "the roving plagiator," compiled his dental medicine from the same source *via* Arculanus. The dental remedies referred to by that mixture of charlatanism and necromancy, John Gaddesden (about 1310 A.D.), sometime professor in Merton College, Oxford, are so thoroughly tainted by medical avarice, superstition and ignorance that it would be an insult to the enumerated writers if we place him in the same category. Merely to mention a typical example of the disgusting therapeutic measures recorded in his bizarre tome, 'Rosa medicinæ' which has been significantly dubbed by the illustrious Guy de Chauliac, "Rosa fatua," the following "mixtum compositum" in the form of a decoction which he recommended to be taken against dental podagra (neuralgia), may be cited: The gall of a cow, wormwood, alum, pepper, nutgalls, cloves, pitch, mustard seed, the heart of a magpie, the fat of mice, crow-dung, plantain and lice. The famous German 'Artzney Buchlein wider allerlei Kranckheit und Gebrechen der Zeen gezogen aus dem Galeno, Avicenna, Mesue, Cornelio Celso,' etc. (Leipzig 1530), is an anonymous compilation which, as far as its pharmaco-therapeutics is concerned, merely exhibits the same stigmata as do the works of the above mentioned writers, i.e., it is an epitome from Dioscorides' dissertations, with slight alterations, as a sequence of having passed through the works of the various authors enumerated on its title-page. In a most interesting collection of Anglo-Saxon manuscripts bearing the quaint title, 'Leechdoms, Wortcunning and Starcraft,' which in modern English would signify "Physicians' prescriptions, the Knowledge of Plants and Astrology," and which was published some decades ago in London — numerous references relating to the diseases of the teeth are contained. Here, again, one meets with many drugs which are readily traced to a dissemination of dental knowledge by the Greco-Roman military surgeons accompanying the conquering cohorts during their occupation of Britain.

It is probably not amiss to depict a conception of the practice of medicine, and incidentally of dentistry, as it may be gathered from the study of the medical works written during the early centuries of the Christian era. The freeborn Roman looked upon the practice of medicine as a handicraft, the pursuit of which was not compatible with the dignity of a "civis Romanus." The practice of medicine in Rome prior to its invasion by the better educated Greek physicians was carried on by slaves; the larger estates depended on their "servus medicus," a slave who had acquired some routine medical knowledge, or the ills of the subjects of the household were looked after by the patriarchal "pater familias." Some of these latter representatives of lay medicine gathered together quite an extensive knowledge of the healing art, and their recorded experiences furnish some of the most valuable data to the medical historians. Celsus, Pliny and Cato are elucidative types of Roman lay practitioners, and incidentally are voluminous and fruitful littérateurs on this subject. To the cultured Romans, who were highly conscious of the blessings of personal hygiene, the demand for the services of some genius who would keep their masticating organs in perfect condition was a matter of necessity. The works of medical writers of this period are filled with innumerable recipes for tooth preparations. The mechanical side of dentistry, which by necessity must have been carried out by specialists, has received its ample share, as is testified by an excerpt from the famous Law of the XII Tables, enacted 450 B.C., which contains the following paragraph: "Neither add any gold (to a corpse); if any one shall have teeth bound with gold, it shall be no offense to bury or burn him with it." Numerous specimens of Roman and Etruscan dentistry have been found in burial-places. The great satirist, Martial, has preserved the name of at least one dentist, Cancellius, «who has grown rich like a senator among the grands and belles dames, and who cures the tooth diseases; and how he can extract!» It is also of interest to note that in the epigrams of Martial many allusions are made to the teeth and their care. So we read, for instance:

> Esse quid hoc dicam, quod olent tua basia myrrham?
> How do I explain it that your kiss smells of Myrrh?

Artificial teeth seem to have been quite fashionable with the Roman dames, as the following would indicate:

> Dentibus atque comis, nec te pudet, uteris emtis;
> Quid facies oculo, Laelia? Non emitur.
>
> Without shame you make show with bought teeth and hair;
> But what about the eye, Laelia; can one buy this also?

Specimens of Etruscan dentistry in form of bridges, crowns, bands, etc., are still preserved in the National Museum of Naples. With the exception of a few monographs the early literature of dentistry is found scattered among the various treatises on general medicine. In the large majority of instances these records are published by medical practitioners, although sometimes by laymen who themselves did not practice the art of dentistry. Prior to the appearance of the work of Fauchard, ‹Le Chirugien Dentiste› (1728), who has been significantly styled the «Restaurateur de la chirugie dentaire,» dentistry is not entitled to the cognomen of a «learned profession.» In reality it constituted the handicraft of vagabonds who traversed the country from one end to the other practising medicine, dentistry, alchemy, chiromancy and necromancy as occasion demanded, now and again interspersing these with a little pilfering. The professional mountebank who presented himself as a tooth-puller, barber, leech and theriac vender was a familiar figure in the market-places of the big cities or at the annual fairs of the smaller towns. The extraction of the aching tooth was incidentally an incentive for the sale of some tooth preparation or an amulet for the prevention of the occurrence of pain in the remaining teeth. The «dentatores» or «dentispices» of the Romans, the «cavadenti» of the Italians, the «arracheur des dents» of the French, the «zahnbrecher» of the Germans, and the «kindhart» of the English represented the bulk of our professional ancestors. The patron saint of dentistry, Saint Apollonia, was canonized in Rome about 300 A.D. Being a Christian, Saint Apollonia was tortured by her persecutors by having her teeth, one by one, extracted, and finally suffered death upon the pyre. Her memory is commemorated on 9 February of each year. Remains of her skeleton are preserved in the various churches of Rome, Naples, Cologne, Antwerp, Brussels and Quebec, and excellent pictures of the saint by Guido Reni, Carlo Dolci, and others are found in Milan, Florence and other cities. The name of Saint Apollonia is frequently mentioned in prayers in the various prayer books of the Middle Ages, and is especially intended for the relief of toothache.

Prior to 1840 comparatively few important communications on dental surgery had appeared. The foremost literature of this time was published in France and England, and a few books of importance appeared in Germany. The United States was at this period principally concerned with the practical development of the new branch of the healing art, and, with the exception of the writings of Longbotham, E. Parmly, L. S. Parmly, Trenor, Fitch, Bostwick, Spooner, S. Brown, the Burdells and others, little was printed in relation to dentistry. Dental textbooks, if used at all, were imported from England, or translations of French works were published. Leonard Koecker, a practitioner of international reputation, pictured the situation quite correctly when he stated, in 1826, that «in the United States, although little or nothing has been done in the way of publishing on the subject of dental surgery, yet I feel myself authorized to say that in no part of the world has this art obtained a more elevated station.» No specific current dental literature was in existence at that time and comparatively few medical journals tried to disseminate the progress of medical and, incidentally, dental knowledge. The few journals were seriously hindered in this laudable cause by the extreme difficulties of interchange on account of the very limited facilities of the postal service. The first dental periodical of this or any other country appeared in 1839 under the name of *American Journal of Dental Science*, and was published by E. Parmly, E. Baker and S. Brown. The first regularly organized dental society of any importance was the «American Society of Dental Surgeons,» which was founded in New York on 18 Aug. 1840, with Horace H. Hayden as president. The birth of dentistry as a distinct and definite profession may be recorded simultaneously with the date of the incorporation of the first dental college of the world, the Baltimore College of Dental Surgery, which received its charter in 1839. Its first session commenced in the following year, with a faculty composed of Horace A. Hayden, Chapin A. Harris, Thomas E. Bond and H. Willis Baxley. Medicine and dentistry were from that year practically divorced, and, while dentistry in its early days depended very largely on medicine for its further development, it bases its fundamental studies at present on general biology exactly in the same manner as medicine, veterinary medicine, or any other branch of the healing art is forced to do. Among the earliest dental practitioners in the United States aside from those to whom we have referred should be mentioned Robert Woofendale, a student of Thomas Berdmore, dentist to His Majesty King George III, Josiah Flagg, James Gerdette, Edward Hudson and many others too numerous to record. The means of education and professional training of these men were extremely limited and they were forced to obtain their knowledge by being apprenticed to some practitioner who would usually extort a large fee for initiating the novice into the art of dental practice. As a consequence, the knowledge thus gained at a considerable expense was usually jealously guarded and professional intercourse among practitioners was therefore a rare feature. A record concerning the more important events of the development of dentistry would be incomplete if the discovery of general anæsthesia were not mentioned, even if it is only *en passant*. To the dental profession of the United States belongs the honor of having introduced into surgery the first practical method of obtaining complete anæsthesia. The discovery of anæsthesia is the greatest boon ever bestowed on mankind for the relief of suffering. With the introduction of nitrous oxide as a general anæsthetic in 1844 by Horace Wells, the stimulation for further researches was initiated and the future development of anæsthesia was merely a sequence of this incentive.

The distinguishing factor of dental training and one which is not required to the same degree in any other department of the healing art is the manual skill and mechanical training needed for the successful practice of the prosthetic or restorative operations which the dentist is constantly called upon to perform. It was the lack of facilities in medical schools for obtaining the necessary training in the mechanical procedures of dental art that led to the establishment of the first dental college and placed dental education upon a basis independent of general medical education. The increase in knowledge of the diseases of the mouth and its contained organs and the growing recognition of the vital relationships of the oral tissues to the body as a whole, have gradually compelled the broadening of the dental educational curriculum until at present all of the fundamental medical sciences are included in the curricula of the best dental colleges, and upon this scientific foundation is erected the superstructure of technical education and manual training necessary to the art of the dentist. The development of dentistry in America has been phenomenal especially in all that pertains to its art side. The incorporation of the systematic teaching of mechanical dentistry in the college course instead of depending upon the uncertain educational results of the apprenticeship system has had greatly to do with creating a body of American practitioners skilled in their art. It is in fact for his skill as an operative dentist that the American practitioner has been mainly distinguished. The art of replacing lost portions of tooth crowns by gold fillings has had its greatest development in America; indeed as we know the operation to-day it may be said to have originated there. As originally practised the ideal gold filling was one which simply acted as a stopper inserted in a cavity produced by decay, for the purpose of excluding moisture and furnishing a surface sufficiently resistant to withstand the wear and tear of mastication. The filling was finished on a level with the cavity margins and no attempt was made to restore the lost contour of the tooth in imitation of its natural configuration. When, however, the discovery of the cohesive property of annealed gold foil was made and promulgated by Dr. Robert Arthur, of Baltimore, in 1855, the whole method of filling teeth with gold was revolutionized and complete artistic restoration of the normal configuration of the tooth by building with gold foil became the accepted ideal of practice. In connection with the general use of cohesive gold as a filling material certain ingenious and important devices came into existence as adjuncts to the operation of tooth-filling, having their origin in the necessities of the case. These were the dental engine, the mallet and the rubber coffer-dam. The operation of preparing the cavity for the reception of the gold involves the removal of decayed portions and frail margins, and giving to the cavity a retentive shape, so that the filling when inserted shall be solidly and immovably held in place. The early methods of cavity preparation were laboriously performed by small chisels and cutting instruments manipulated exclusively by the hand. Hand instruments were also exclusively used for the insertion and condensation of the gold foil in building the filling and subsequently giving it the required form and surface finish. The introduction of the dental engine run by foot-power or by electric motor has not only greatly facilitated the operation of tooth-filling but has made possible more accurate and perfect results. So manifold has been the improvements made in the dental engine and its equipment of accessory appliances that it may, if the operator so desire, be used for every step of the operation from cavity preparation to the finished filling. As the cohesive property of gold, upon which its value in restoring the form of the tooth depends, is at once destroyed by contact with moisture, great difficulty was formerly experienced during large filling operations in excluding the gold from contact with saliva; napkins, bibulous paper and various mechanical devices were used for the purpose, but were often insufficient to prevent the destruction of a filling during the progress of its insertion. The device known as the rubber dam, introduced by Dr. S. C. Barnum of New York, about 1865, solved the problem of effectually excluding moisture from the teeth undergoing filling operation, and made possible more extensive and thorough restorations than had previously been attempted. The discovery of the usefulness of the cohesive property of gold in filling operations soon brought into requisition other means than simply hand pressure or condensing the gold foil into a solid homogeneous mass. It was soon found that greater solidity could be obtained by the percussive force of a mallet applied to the gold through the plugging instrument, so that the use of the mallet became general for the purpose, largely through the persistent advocacy of Dr. W. H. Atkinson of New York. The earlier forms of condensing mallets were simply hand mallets with heads made of various materials and different weights to attain desired variations in the impact and quality of the blow delivered upon the condensing instrument. Later, automatic mallets, combining a plugging instrument and mallet, were introduced. In these instruments the blow was produced by a hammer propelled by the release of a spring compressed by pressure, the malleting mechanism being contained in a casting connected with the plugging point which was applied to the surface of the filling upon which the impact of the blow was ultimately expended. In 1867 Dr. W. G. A. Bonwill of Philadelphia introduced his electro-magnetic mallet, an instrument which involved the principle of the Morse telegraphic recorder so modified that the armature of the electro-magnet was effectively utilized as a mallet acting upon the free end of the gold-plugging instrument. With the automatic interrupter of the current afterward added to it the Bonwill instrument contributed greatly to the improvement of gold-filling operations both in the solidity of the gold, its more accurate adaptation to the walls of the cavity and in lessening the fatigue and discomfort of both patient and operator incident to the operation. The blows delivered by the electro-magnetic mallet while light are extremely rapid, an advantage which its inventor sought to realize in a later device, to be used in connection with the dental engine, known as the Bonwill engine mallet, an instrument of high efficiency and the parent device of many subsequent modifications. To further lessen the stress encountered alike by patient and operator in the malleting of gold fillings the cast gold inlay was introduced by Dr. W. H. Taggart in 1905. This method of restoring lost tooth substance consists in the utilization of a contoured gold plug obtained by casting pure gold into a mold made from a wax pattern and which is set into the prepared tooth cavity with a thin layer of cement. The extensive use of gold as a filling material as the perfection to which the technique of its use for that purpose has been developed, especially in America, has recently brought about a reactive tendency against the display of elaborate operations of gold, especially in conspicuous positions in the front teeth, æsthetic considerations stimulating the search for some substitute more in harmony with the texture and color of human teeth. Recently through the invention of an improved technique by Dr. C. H. Land of Detroit, Mich., and the further investigations of Dr. N. S. Jenkins, an American dentist formerly residing in Dresden, Germany, the use of porcelain as a restorative material has become practically possible and bids fair to supplant gold as a filling — at least in conspicuous situations. The durability of porcelain restorations as compared with gold fillings remains to be tested by time and experience, but the immediate result is in all respects in favor of porcelain, especially in the matter of appearance, which so harmonizes with the teeth structure in color and texture as to be invisible when the operation is correctly performed. The filling of cavities is also extensively done with plastic materials that have the property of becoming hard in the course of time after having been inserted in a soft state. This class of materials includes the amalgams and cements, also gutta-percha. Certain of these materials, the cements for example, serve only a temporary purpose, and their usefulness is therefore of limited duration. Silicate cements which at present are extensively employed as substitutes of gold and porcelain in the restoration of decayed portions of the anterior teeth must also be classified as limited in duration. The amalgams, however, while unsightly in appearance, are extremely useful; being quite durable and capable of insertion without great difficulty, they can be used in cases of great loss of tooth structure, thus restoring many cases that could not otherwise be as successfully treated and with less cost than gold filling. Following the researches of Koch in bacterial pathology the rôle played by micro-organisms in the causation of dental diseases became the subject of study by numerous investigators, notably the late Prof. W. D. Miller, an American dentist resident in Berlin, through whose researches the cause of tooth decay was explained. Similarly the causal relation of disease-producing micro-organisms to disorder of the dental pulp and the tissues surrounding the roots of teeth has been clearly made out, with the result that operations upon the pulp chambers and root canals of teeth in which the pulp has been devitalized by disease or design are now among the recognized conservative operations of dentistry. This advance in the treatment of pulpless teeth has made possible the permanent saving of multitudes of teeth in a condition of comfort and functional usefulness which were previously inevitably sacrificed or lost. Later investigations in the domain of dental and oral pathology are throwing light upon the causes and improving the modes of treatment of those diseases of the retaining tissues of the teeth which when unchecked result in their early loss by destruction of their attachment to the gums and alveolar sockets. The grafting of artificial crowns of porcelain upon healthy natural roots is accomplished in a large variety of ways, the attachment being by metallic dowels cemented into the properly enlarged pulp canal of the root, this being in most cases reinforced by means of a gold collar or ferrule connected with the porcelain crown, closely encircling the periphery of the root at and slightly under the gum margin. Perfect adaptation of the crown and root end is obtained by correctly shaping the exposed portion of the root and then the properly fitted porcelain crown is attached to this foundation by gold solder and backing plate of gold connecting with the platinum pins of the crown. In certain cases hollow crowns, made entirely of gold plate shaped to the contour of the original natural crown, are used upon the roots of the grinding teeth instead of porcelain crowns, as they possess the advantage of superior durability. Aggregations of crown permanently united upon their contiguous surfaces and supporting crowns in spaces where teeth have been extracted constitute so-called bridge work. No restorative operation in dentistry requires more judgment and skill, nor has any dental procedure been more abused in its performance than bridge work. Where the operation is intelligently and skilfully done, it constitutes the most satisfactory result both as to comfort, utility and appearance that prosthetic dentistry has yet attained; otherwise it defeats the very object for which only it should be undertaken, namely, the restoration of the denture to full functional usefulness and æsthetic appearance.

The department of dentistry technically known as mechanical or prosthetic dentistry comprises all those operations and the laboratory manipulation of the materials involved in the construction of substitutes for lost dental organs and parts of the oral tissues. Where lost teeth are to be replaced by means other than those described as crown and bridge work, it is done by mounting the porcelain crowns upon a base-plate adapted to the surface of the palatal vault as well. An impression of the alveolar arch is taken in an impression tray containing a plastic material which will subsequently harden, usually plaster of paris or a modeling compound consisting of gum kauri, stearin and talc; beeswax or beeswax and gutta-percha have been used, but are now practically abandoned for this purpose. Into the matrix formed by the impression a batter of plaster of Paris is poured, which after it has hardened forms the cast upon which the base-plate to support the artificial teeth in the mouth is constructed. The base-plate may be of vulcanite or of metal, and in the former case the porcelain teeth are adjusted to the cast by means of wax, and a wax plate is constructed which is the counterpart of the projected finished vulcanite plate. When the arrangement of the teeth to the wax trial plate has been found to be satisfactory by actual trial in the mouth of the patient, it is returned to the cast and the whole embedded in plaster of Paris contained in a sectional iron founder. The upper and lower sections of the flask are separated after the investing plaster of Paris has fully hardened, and the wax is completely removed by a stream of boiling water, leaving a facsimile matrix in the plaster, which is then packed full of vulcanizable caoutchouc; the flask is then closed and after being firmly bolted together is subjected to the action of the heat from superheated steam for about an hour at 320° F. in a vulcanizer. The case is allowed to cool and when removed from the matrix the now thoroughly hardened plate is finished with a fine polish and is ready for insertion in the mouth. Metallic plates serving as the base of support of artificial teeth are constructed by stamping or swaging the flat plate cut approximately to the desired pattern between male and female dies, made from zinc and lead, respectively, which have been obtained by casting the molten zinc into a sand matrix made from the plaster of Paris model of the alveolar arches. This furnishes a zinc model or male die upon which a female die or counter-die of lead is cast, and between these the metallic base-plate is struck up to the form of the alveolar arch upon which it is intended to rest. Upon this base-plate porcelain teeth are fitted and attached by a metallic connection between the platinum pins (which for the purpose are baked in the porcelain texture of the artificial teeth) and the base-plate, union being made by soldering. Dentures upon an enameled platinum base-plate constitutes a form of work known as continuous gum work, in which, after the teeth by means of their pins have been united to the plate by soldering with pure gold, porcelain paste or "body," as it is technically called, is packed around the roots and between the teeth; then carved into form until the natural contour is reproduced. The piece is then subjected to high heat in a muffle until vitrified, after the manner of firing or baking china or pottery. It is next given a coating of enamel in imitation of the natural gum color, and after this has been fused in the muffle and the piece finally finished it constitutes the most artistic, hygienic and anatomically perfect denture of which dental art is capable. The prosthetic department includes, besides the restoration of lost teeth, the construction of mechanism for the correction of palatal defects whereby imperfect speech and deglutition are restored to practically normal conditions; it includes also the construction of splints in the treatment of fractures of the jaws and the restoration of parts of the jaws lost by accident or disease; construction of mechanism for the correction of irregular positions of the teeth and for the restoration of facial deformities due to irregular or imperfect development of the jaws and bones of the nasal or facial regions. The correction of irregularities in the position of the teeth has developed such importance and covers such a wide field of study and work as to constitute a distinct specialty of modern dental practice. This department of dentistry is termed orthodontics; its importance is due not only to the cosmetic value of its results, but because of the direct bearing which irregular positions of the teeth and deformities of the dental arches exert upon the bodily health. The whole field of dental and oral pathology has been so far developed by study and research as to place modern dental practice distinctly among the recognized specialties of the healing art. Most of the bacteria causing general bodily disease find access to the system through the mouth, which is also the habitat of many bacteria, benign and disease-producing as well. Hence the hygienic care of the mouth as a protection against disease invasion is of the utmost importance. Late researches have shown that the mouth, its tissues and its secretions, and the teeth themselves, furnish important indications of certain bodily diseases, malnutrition, etc., which are extremely valuable as diagnostic means. The training of the dental practitioner has therefore been enlarged so that in the foundation elements it is now coextensive with that of the practitioner of general medicine, but specialized with reference to its particular field of inquiry.

In 1918 there were about 46 institutions within the border of the United States and its possessions engaged in the exclusive teaching of the science and art of dentistry. These institutions are partially bona-fide departments of universities, partially correlated therewith, or they are conducted as private schools. The present dental curriculum consists of four annual sessions each in consecutive academic years; each academic year consists of a period usually beginning about the first of October and lasting until the middle of June. In most institutions the courses in dentistry are open to women on the same terms as to men. For the session 1918–19 the preliminary educational requirement for matriculation is the completion of a standard four-year high school course or the equivalent, which (in the States of New York and Pennsylvania) must include the satisfactory completion of a one-year course in an approved high school in each of the following sciences: physics, chemistry and biology, or in lieu thereof, the passing of each of these sciences at 75 per cent or above in examinations conducted by the Bureau of Professional Education of the respective State or other state examinations of equivalent grade. These requirements may be satisfied by a certificate from an approved high school or a preparatory school of equal academic grade or by entrance examination. At the close of the course of study the student who has fulfilled all the requirements satisfactorily receives his degree. This degree in most institutions is designated as Doctor of Dental Surgery (D.D.S.), while a very few (Harvard, Minnesota, etc.) confer the degree of Doctor of Dental Medicine (D.M.D.). The practice of dentistry is regulated separately by each political division of the United States. Examining or licensing boards look after the enforcement of the laws regulating the practice of dentistry in each individual State. In most instances the pre-requisite for obtaining a state license is the possession of a bona-fide diploma from a reputable dental school recognized by the National Association of Dental Examiners. Interchange of licenses is practised by a few States. There were in 1918 approximately 47,000 registered dentists in the United States, i.e. about one dentist to each 2,000 inhabitants. A lower ratio (about one to three or five thousand) may be recorded for other civilized countries. The dental profession of the United States, in harmony with other professional callings, has formed numerous associations for the promotion of scientific intercourse, among which the National Dental Association, the respective State dental associations and many city and county dental societies are most influential bodies. The dissemination of useful professional knowledge is readily accomplished through numerous current periodicals, of which 28 appear in the United States. The Army and Navy Dental Departments offer excellent opportunities to the recent graduates. In 1918 the army dental corps numbered 210, the dental reserve corps 5,124 (of which 1,337 were on active duty), and the dental corps of the National Guard 261. A proportionately less number was enlisted in the navy. During the closing hours of the 65th Congress a bill was passed and approved which states that within the Dental Surgeons Corps there shall be «commissioned officers of the same grade and proportionately distributed among such grades as are now or may be hereafter provided by law for the Medical Corps, who shall have the rank, pay, promotion and allowances of officers of corresponding grades in the Medical Corps, including the right to retirement as in the case of other officers.»

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DENTISTRY, Public. This term may properly be used to denote all phases of dental service except that bought of a dentist by an individual. It includes military and naval dentistry as well as that provided by municipalities and by privately endowed institutions. It is one of the most recently realized of the responsibilities of the state, 15 years embracing the whole organized movement up to 1918, save perhaps in some few advanced communities.

Budapest had «a fine public dental clinic in 1892.» In England the government began to take a hand in the care of the mouths of the people in 1904. In a report of the Inter-Departmental Committee on Physical Deterioration presented to Parliament a warning was sounded that «the teeth of the people have become much worse of late years and in many parts of the country may be described as very bad.» (England was at that time using 90 pounds of sugar per capita per year). It was suggested that dental hygiene be given special prominence and far better practical attention in the schools. In France nearly every hospital long since has had a dental department giving free treatment to the poor, besides numerous municipal clinics in Paris and in the larger provincial cities. Italy has not been behind in this work: Florence early had three dental clinics, Naples two, Rome one attached to the University School of Dentistry, while Brescia, Turin, Milan, etc., in like manner carried on this work at a period relatively early. «Germany had 33 clinics exclusively for school children,» and Switzerland followed closely the German system. (Zentler).

America, which by universal consent has always led the world in dentistry, has been a little slow in taking up the work for the children; but it has in some respects surpassed all other nations in public dentistry, thus maintaining its original lead.

Boston at an early date began the system of school medical service and promptly agitated for and actually established dental therapeutics as a part of that system, including dental nursing as a profession legalized and encouraged by the general court (legislature) of Massachusetts. Since 1914 that city has had in the Forsyth Dental Infirmary for Children the most adequate institution for public dentistry in the world. In December 1910, by the appointment of two dental consultants and special lecturers on oral hygiene of the New York State department of health, «Commissioner E. H. Porter earned the distinction of being the first State commissioner of health in the United States to take an active part in the crusade for clean mouths,» the contention of their public lectures, long since and now common knowledge, being that «a clean tooth never decays and a lazy tooth becomes in time a rotten tooth.» Haven Emerson of New York city found in the summer of 1907 that 97 per cent of the «stay parties» of the Sea Breeze (adults) had decayed teeth; and the American Statistical Association in the same year showed that approximately 9,000,000 children in the United States had bad dental equipment or diseased teeth.

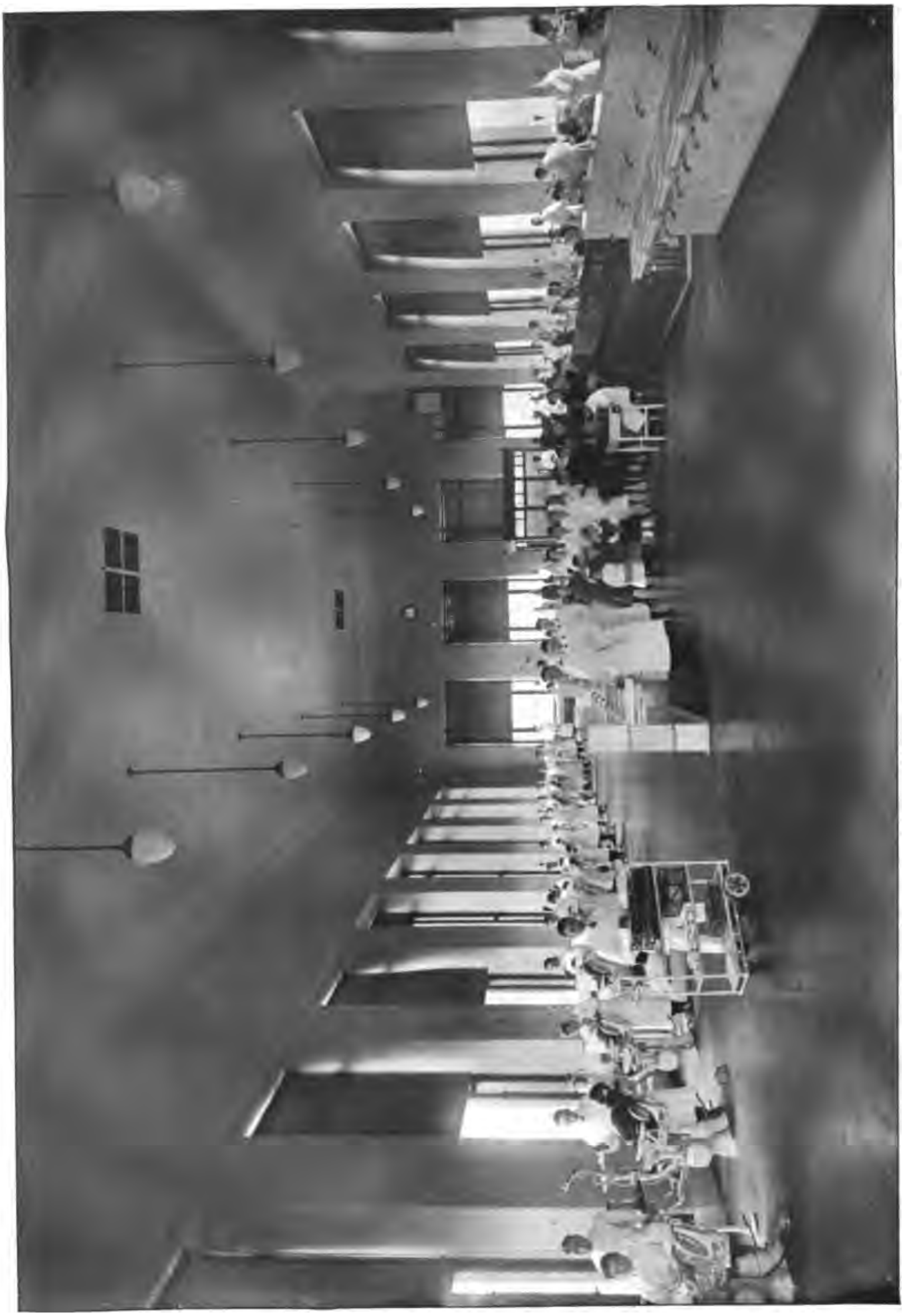
The Boston institution is the pioneer and sole present model for further constructions in the direction of the public care of children's teeth, mouths and throats. The institution developed from the philanthropic idea of Mr. James Bennett Forsyth, a Boston business man, who had been a great sufferer from neglected teeth. The idea acted upon by his two brothers, John Hamilton and Thomas Alexander Forsyth (the actual creator of the Infirmary), and the heirs of another deceased brother, Mr. George Henry Forsyth, resulted in the foundation and erection of a memorial building of utility and beauty, the equipment and administration of which is unrivaled for its objects, which are summarized as follows:

(1) To educate parents, teachers, nurses and children in the hygienic value of healthy mouths and sound teeth, and to furnish instruction as to the best methods of securing the same.

(2) To prevent dental caries by oral prophylaxis and by the care and preservation of the temporary teeth.

(3) To investigate the causes and to study the prevention of oral diseases and caries of the teeth.

(4) To remedy, so far as possible, existing



Operating Room, Forsyth Dental Infirmary for Children, Boston, Mass.

conditions of dental caries and other oral diseases.

(5) To establish and promulgate a higher standard of dental asepsis.

(6) To furnish for the dental profession an opportunity for charitable work and for the educative experience of a large clinic.

War work was enthusiastically taken up by the institution, courses were organized to fit dentists for service in the Dental Officers' Reserve Corps, 600 dentists registered for the first course and the director was appointed preliminary dental examiner of the corps. The lectures given in the course have been compiled and edited as a textbook under the title, 'War Dentistry.'

In addition to its work more strictly and directly therapeutic, this infirmary conducts two schools, a training school for dental hygienists and a postgraduate school of orthodontia. There are departments of social service and registration; Roentgen rays; extraction; surgery; orthodontia; research; oral hygiene; library and museum; lectures for the public and the staff; besides the extensive dental-clinic department suggested in our illustration. In 1917 the total number of cases treated was 31,750; new cases, 16,457; returned cases, 14,293; emergency cases, 2,917; average number of full-time operators, 18, and of half-time operators, 14; average number on visiting staff, 75; and average number of patients daily, 363.

It cannot be doubted that when the world returns again to the pursuits of peace and social progress numerous such institutions will spring up to educate and to cure the children of this and of other lands, certain that septic teeth are the cause of much pain and disease heretofore ascribed to other causes.

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DENTISTRY IN THE UNITED STATES. From the earliest times dentistry was practised as a branch of surgery. Herodotus speaks of means of preserving the teeth, and artificial teeth are alluded to by Greek and Latin poets. In the United States the first historic mention of dental practice is about the year 1785, and for some 40 years thereafter there were but few dentists in the country, and they were for the most part peripatetic, only the largest cities giving support to a resident dentist. The Baltimore College of Dental Surgery, established in 1839, was the first institution of the kind in the world. It was the direct result of an agitation to put dentists on a higher professional plane and followed an unsuccessful attempt to found dental chairs in medical schools. It had been argued that pathology of the mouth and dental mechanics should be taught in the medical schools as branches of medicine and that graduates choosing these courses should receive the degree of M.D. as in the case of other branches of medicine. At the beginning no previous preparatory studies were required. To obtain a graduate's degree the student was required to attend two courses of lectures, each of four months, covering dental surgery, dental mechanics and dental pathology. In addition some general instruction was given in anatomy, physiology and therapeutics. A previous experience of five years as a practising dentist was credited as equal to one term's attendance. In 1839 also the *American Journal of Dental Science*, the first dental periodical in the world, was established. For five years this was the only publication of the kind, but within a few years a dozen had come into being. In 1845 the Ohio College of Dental Surgery (since 1888 the dental department of the University of Cincinnati), in 1856 the Pennsylvania College of Dental Surgery, in 1863 the Philadelphia Dental College were founded. These separate schools taught at first very little medicine, but paid attention almost entirely to mechanical training and to those branches which a dentist must know. All conferred the degree of D.D.S. In 1865 the New York College of Dentistry was founded with the purpose of educating men to practise dental surgery as a specialty of medicine. The curriculum included the fundamental departments of medicine with operative dentistry and oral prosthetics. In 1867 Harvard University opened a dental department and began to teach dentistry as a branch of medicine with the special degree D.M.D. (*Dentariæ medicinæ doctor*). By this time the practice of dentistry had come to include to a large degree the healing of diseased teeth and mouth tissues, requiring medical as well as dental education. In 1875 the University of Michigan and in 1878 the University of Pennsylvania followed the example of Harvard in opening dental departments. Since 1878 there has been a most astonishing increase in dental schools and dental students, due largely to the fact that the dental laws in many States now require graduation from a dental school as a condition for license. In 1878 there were 12 schools and 701 students; in 1910 there were 53 schools and 6,439 students. The number of practitioners of dentistry in the United States in 1917 was 46,223; 115 institutions in the United States (and 7 in Canada) are devoted to the systematic education of dentists; the profession has an extensive literature of standard works and periodical publications, and the furnishing of supplies and material used in dental practice is an enormous industry involving millions of capital, a growth which has all developed within 70 years.

In 1840 the American Society of Dental Surgeons, the pioneer of the associations to which dentistry owes so much of its progress, was organized in New York. This was followed by the organization of the Virginia Society of Surgical Dentists in 1842, and within the next five years several other district and State organizations were formed. The National Association of Dental Faculties, organized in 1884, has done much to strengthen courses of study in dental schools. At the time of its organization only those schools were admitted which had proper facilities for instruction and a corps of competent teachers. From time to time standards have been raised by rules governing attendance, instruction and graduation. The schools in the association, all require three full courses of dental lectures. The main defect of these schools as a rule is failure to require a sufficient preliminary general education for admission.

The first State to regulate by law the practice of dentistry was Alabama. In 1841 a law was passed requiring the examination of dental practitioners in the State by a medical board containing at least one dentist of recognized ability. This was the first legislation as to dentistry passed in any country. For nearly 30 years no other State passed such a law, but here and there regulations affecting the practice of dentistry became part of the existing statutes of several States. The next State to pass a dental law was New York, but this action was not taken till 1868. The English law was enacted in 1878, and those of other countries about that time or later.

Supervision.— The practice of dentistry is now regulated by statute in all political divisions of the United States. Examining boards are appointed in Alabama, Kentucky, North Carolina and South Carolina by the State dental associations; in District of Columbia by district commissioners; in Indiana by the governor, State Board of Health and dental association; in Nebraska by State Board of Health; in New York by the Regents; in the Philippines by the Board of Health; in the remaining divisions by the governor, usually, on recommendations of the State dental societies.

Licensing.—Interchange of licenses is highly desirable and will doubtless be brought about to some extent in the near future. An important step toward interchange of licenses was taken in 1898 when the New York dental law was amended so that the Regents may now issue their license to any applicant who holds a license to practise dentistry granted by a State board of dental examiners, indorsed by the Dental Society of the State of New York, provided that his preliminary and professional education meets the New York statutory requirements. The dental examiners of Pennsylvania having been endorsed by the New York State Dental Society and recommended by the State dental examiners, the Regents endorse Pennsylvania licenses granted under the new régime.

Licentiates of Other States.—Delaware, Indiana, Montana, Ohio, and Wisconsin admit licentiates of other States having equal requirements on «signification of reciprocal courtesy»; Illinois on approved diploma from reputable dental or medical college, or on five years' practice; New Jersey, Pennsylvania, and Wisconsin, on proof of license from other State boards having equal requirements; New Mexico and Utah, on proof of diploma recognized by the National Association of Dental Faculties; New York, on proof of license from another State board having equal requirements and endorsed by the New York State Dental Society, or on graduation from a registered dental school and six years' practice; District of Columbia, Louisiana, Michigan, Missouri, Nebraska, Nevada, North Dakota, Oklahoma, South Dakota, Tennessee, Wisconsin, on approved diploma from other States; Kansas, Kentucky, Ohio, Texas, on approved diploma from a dental college in the United States or any foreign country. In the remaining political divisions no provision is made in the law for admission of licentiates of other States.

Synopsis of Educational Requirements.— In most divisions dental diplomas do not now confer the right to practise, an examination being required. The few exceptions are at the discretion of the examining boards.

The requirements for admission to the examinations before the licensing boards of the several States as compiled up to 1 Jan. 1918, are as follows:

Alabama, a diploma of graduation from some dental college or collegiate department recognized by the National Association of Dental Faculties, indicating a grade of at least 75 per cent in all dental branches.

Alaska, a diploma from a reputable dental school. Dentists practicing in the Territory since 1909 who have such diplomas are registered and licensed without examination.

Arizona, a diploma from some reputable dental school, or a license issued by another State requiring equal proficiency.

Arkansas, a diploma of a reputable school of dentistry; or the certificate of the examining board of a State in which equal proficiency is required.

California, diploma of reputable dental school endorsed by State board of dental examiners, or four-year high school course and not less than five years' practice; or certificate of examining board of another State requiring equal proficiency showing five years' recent practice.

Colorado, diploma from legally organized reputable dental school.

Connecticut, diploma of graduation from recognized dental school, or three years' practice in the State; or certificate from another State board of dental examiners with equal requirements. The license may be issued without examination in the discretion of the board. Assistants are licensed to practice in the office of a licensed dentist.

Delaware, no restrictions to applicants; licenses also those who have lawfully practised dentistry in States which reciprocate such courtesy to Delaware dentists.

District of Columbia, certificate of the board of examiners that qualifications for examination are sufficient.

Florida, diploma of graduation from recognized dental college or collegiate department.

Georgia, diploma from reputable dental college.

Hawaii, a diploma of graduation from a recognized dental college or collegiate department.

Idaho, a diploma from a legally organized dental school; a license from the examining board of another State; or four years' study with a licensed Idaho dentist.

Illinois, a high school education or its equivalent, previous to the dental course, and a diploma of graduation from some reputable dental college; or active legal dental practice in some other State for the five years next preceding the examination.

Indiana, diploma recognized by National Association of Dental Faculties.

Iowa, diploma from reputable dental school. Any dentist having been engaged in lawful practice for five years under certificate of a board of dental examiners in another State may be licensed without examination.

Kansas, a diploma from a reputable dental school; or previous lawful dental practice in another State for the five years next preceding the examination.

Kentucky, diploma from a recognized dental college or collegiate department.

Louisiana, no stated requirements; examines all applicants.

Maine, a diploma of graduation from a reputable dental college and a preliminary education equivalent to that required for graduation from a Maine high school. The board may license at discretion, without examination, dentists of five years' practice in other States requiring equal proficiency.

Maryland, a diploma of any legally authorized university or collegiate dental school. A licentiate of another State may be licensed without examination at the discretion of the board.

Massachusetts, a diploma from an approved dental school; or at least three years' study without diploma, at the discretion of the board. Dentists with five years' practice in other States demanding equal requirements are licensed without examination.

Michigan examines all applicants; and issues licenses without examination to licentiates of other States which demand equal proficiency.

Minnesota, a diploma from a reputable dental school; or five years' lawful dental practice in another State. A licentiate of another State may be licensed without examination, at the discretion of the board.

Mississippi, a diploma of a reputable dental school and a preliminary education equivalent to a high school course.

Missouri, a diploma of any authorized dental school.

Montana, diploma of a reputable dental school; or five years' dental practice in any State which extends a similar courtesy to Montana dentists.

Nebraska, a diploma of graduation from a reputable dental school, and such preliminary education as shall be approved by the dental secretaries of the State.

Nevada, a diploma from a recognized dental school, and a three-year course in high school.

New Hampshire, a diploma of a reputable dental school; or practice in another State for the five years next preceding the examination. A dentist holding a certificate of proficiency from another State may be licensed without examination at the discretion of the board.

New Jersey, a certificate of good moral character from two licensed dentists of the State, a preliminary academic education of four years in a high school, and a diploma from an approved dental school, attested by an identifying photograph endorsed by an official of the school; or five years' practice immediately preceding application certified by the board of the State in which the practice was carried on.

New Mexico, a diploma of graduation from a reputable school of dentistry.

New York, a four-year high school course, or its equivalent and a degree from registered dental school or medical degree with a special two-year course; or license to practise dentistry in another State, or a practice of 25 years without the State, or in a foreign country.

North Carolina, a diploma of graduation from some reputable school of dentistry.

North Dakota, preliminary education of four years at high school, a diploma from an approved school of dentistry, and at least one year in the State University, or an equivalent institution; or five years of practice in dentistry in another State requiring equal proficiency.

Ohio, a certificate of the State superintendent of public instruction that the applicant is possessed of an education equal to that required for graduation from a high school, and a diploma from a legally chartered dental school; or five years' dental practice under license in another State requiring equal proficiency, providing that such State reciprocates such courtesy. In the latter case a license may be issued without examination at the discretion of the board.

Oklahoma, a diploma of graduation from a dental college approved by the examining board.

Oregon, diploma from dental school in good standing, or dental study and practice in Oregon prior to this act.

Pennsylvania, a competent preliminary education and a three-year dental course; or a diploma of a recognized dental school.

Philippines, diploma from legally incorporated dental school.

Porto Rico, a diploma of a reputable dental school, certified as genuine by two freeholders. Lacking these, the applicant may demand examination on his merits.

Rhode Island, graduation at a recognized dental college; or actual practice of dentistry in another State for the five years next preceding the examination.

South Carolina, no requirements; all applicants examined.

South Dakota, a diploma of graduation at an approved dental school; or practice in dentistry in another State for the five years immediately preceding the examination.

Tennessee, a diploma of a reputable dental school.

Texas, no restrictions; examines all applicants.

Utah, diploma recognized by National Association of Dental Faculties, or two years' practice or three years' study with licensed dentist.

Vermont, a preliminary high school course, and the diploma of a reputable school of dentistry.

Virginia, a diploma of graduation from a recognized dental college; or active practice of dentistry in another State for the five years preceding the examination.

Washington, a diploma from a recognized dental school.

West Virginia, the diploma of a reputable dental school. Any dentist holding a license from another State may be licensed after examination.

Wisconsin, a general education equivalent to a four-year course in the Wisconsin high schools, and a diploma of graduation from a reputable dental college; or license to practise in other States issued previous to 1909, and with at least five years' practice in such State — provided a similar courtesy is extended to Wisconsin dentists removing to such State.

Wyoming, a diploma from a recognized dental college or collegiate department.

DENTITION. See TEETH.

D'ENTRECASTEAUX (dän-tr-käs'tō) **ISLANDS,** since 1884 part of the British protectorate of New Guinea, lie north of the southeast extremity of New Guinea; area 1,083 square miles. They comprise three chief islands separated by narrow channels. They are named after the French admiral and explorer, Joseph Antoine Bruni, chevalier d'Entrecasteaux (q.v.), who visited these waters in 1792. His name is also preserved in D'Entrecasteaux Point on the southwest coast of western Australia and in D'Entrecasteaux Channel, separating the south of Tasmania from the Bruni Islands. The islands contain boiling springs and other indications of volcanic action. There are several very high mountains. Administratively, the islands are part of the Territory of Papua, the name given to British New Guinea by a proclamation of the governor-general of Australia 1 Sept. 1906.

DENUDATION. See EROSION.

DENVER, James W., American soldier and frontiersman: b. Winchester, Va., 1817; d. 9 Aug. 1892. He removed to Cincinnati, Ohio, in 1842, where he studied for the bar. Later he removed to Missouri, where he raised a company and served as captain in the Mexican War. In 1850 he went to California where he became prominent in politics, serving as state senator, and was appointed secretary of state, and afterward was elected to the 34th Congress. Before the end of his congressional term he was appointed commissioner of Indian affairs, but resigned to accept the office of governor of the Territory of Kansas in 1858. He returned to Washington after 12 months of service leaving the territory well-organized and law-abiding. He returned to California in 1859, but soon after removed to Wilmington, Ohio. He served in the Union army as Brigadier-General of volunteers during the Civil War until 1863. After the war he practised law in Washington, D. C. General Denver, at that time governor of Kansas, suggested the name Colorado for the Territory formed out of Kansas, Utah, New Mexico, and Nebraska, and the capital city of Saint Charles was renamed Denver in his honor.

DENVER, Colo., city, capital and commercial centre of the State, 639 miles west of Kansas City, 538 miles from Omaha, 2,025 miles from New York and 1,457 miles from San Francisco.

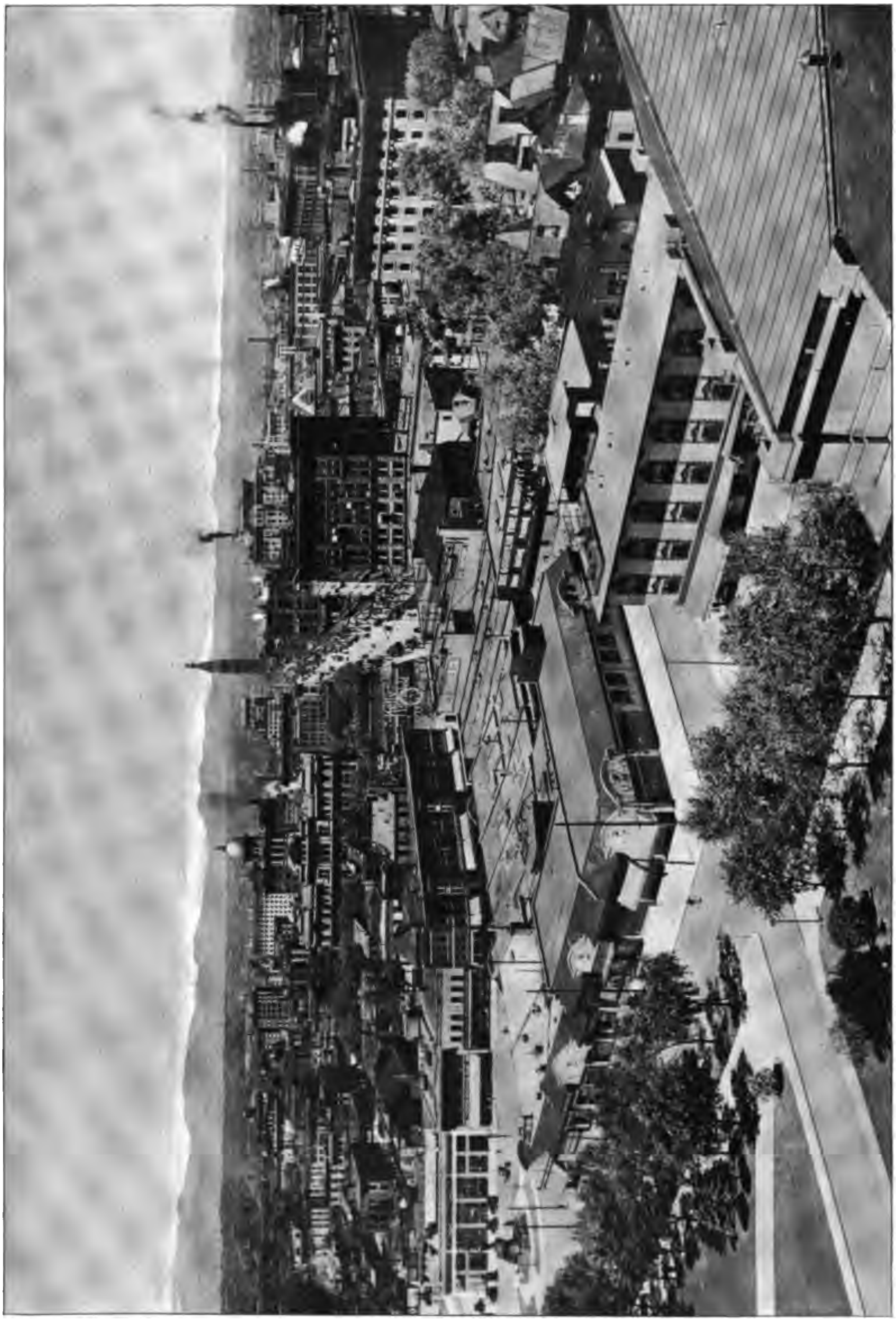
Topography.— It is situated on both sides of the South Platte River at its junction with Cherry Creek, usually a dry stream, but at intervals carrying great floods of water; lat. 39° 40′ 36″ N., long. 104° 56′ 55″ W.; altitude, 5,270 feet. The site of the «Queen City of the Plains,» as it has been designated, with an area of 58¾ square miles, coterminous with the county of Denver, slopes gently back from either bank of the river, and has a commanding view of the main range of the Rocky Mountains, terminating with Pike's Peak on the south and Long's Peak on the north. It lies 15 miles from the foot-hills, the eastern base of the Rocky Mountain Range.

Government, Municipal Conditions.—The municipal government is vested in a mayor elected for three years, a mayor's cabinet of four members, consisting of the managers of revenue, safety and excise, parks and improvements, and health, all appointed by the mayor, and nine elective councilmen. The manufacture or sale or giving of alcoholic and malt liquors is prohibited by the constitution of the State, and public drinking places do not exist. The city is laid out regularly with broad streets and is substantially built with brick and stone, no wooden structures having been permitted since 1876. In 1915 there were 990 miles of streets, 370 miles of which were graded and surfaced with asphalt or disintegrated granite; 700 miles of sidewalk are uniformly paved with stone or concrete and 38.59 miles of alleys are likewise paved. There are 141.25 miles of storm and sanitary sewers. The streets are generally bordered by trees, the elm and maple being most abundant; but every shade tree known to the local forester can be found.

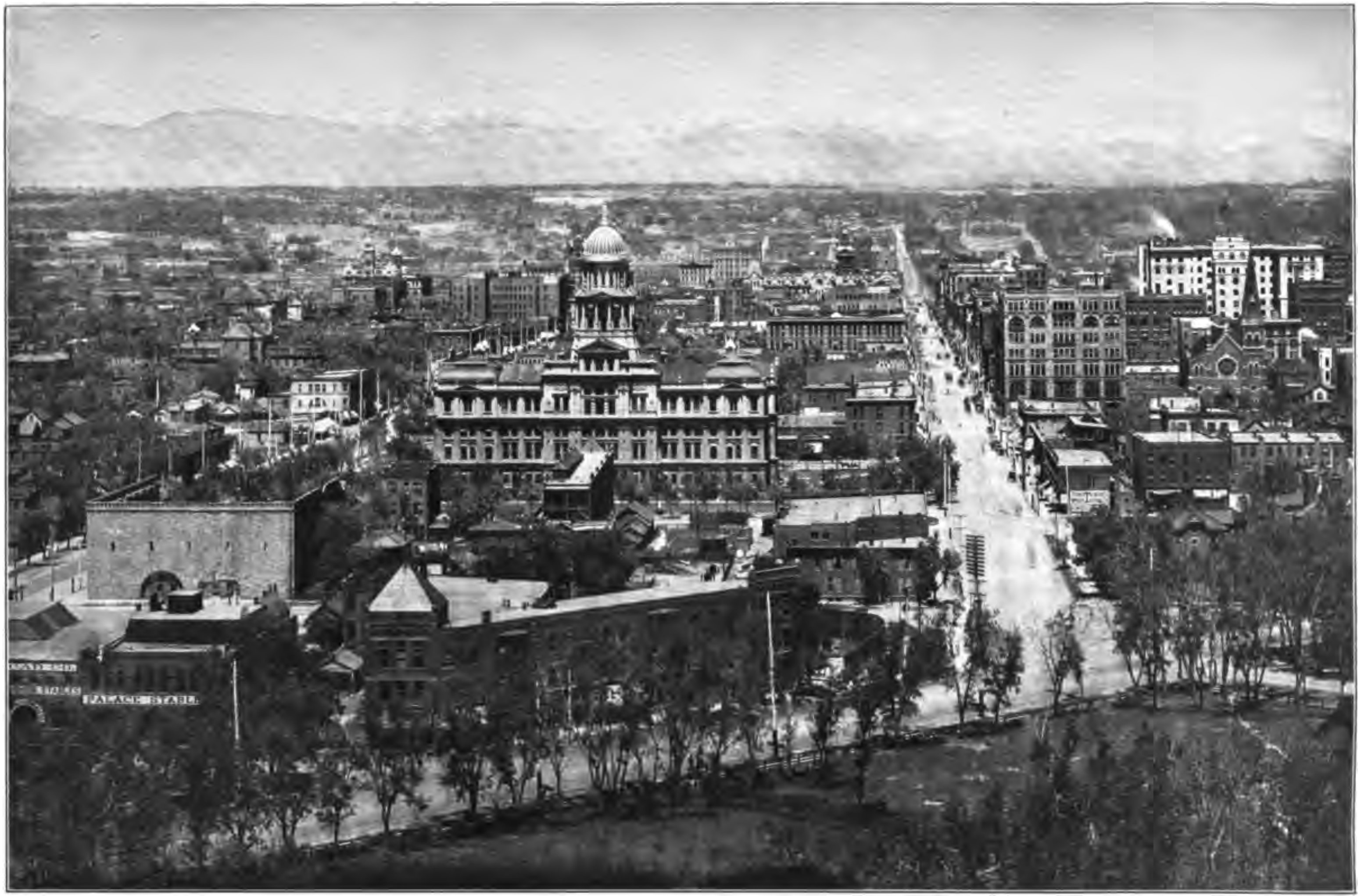
Public Utilities.— The public utilities are modern in every particular. Street cars operated by overhead trolley traverse 203 miles of streets, and in 1915 carried 72,983,000 passengers. Overhead trolley lines also connect with Golden, 12 miles west, Boulder, 30 miles northwest, and Littleton, 10 miles south. Gas, electric light and electric power are supplied by the Colorado Power Company. The current used is generated near Glenwood Springs, west of Denver, and transmitted 150 miles, and also near Boulder, whence it is transmitted 50 miles. Telephone communication exists between Denver and all communities in neighboring States; long distance service extends to the two oceans. The domestic water supply is furnished by The Denver Union Water Company, a private corporation. Water is taken from the South Platte River, Cherry Creek and Bear Creek at distances varying from 6 to 48 miles from the city. The greater portion of the water is handled through two reservoirs known as Cheesman and Marston lakes, having a joint capacity of 33,000,000,000 gallons, furnishing a storage reserve equal to the needs of at least half a million population. The water from these reservoirs, although of remarkable natural purity, is all filtered before reaching the city mains. The daily consumption for domestic and irrigating purposes averages approximately 220 gallons per capita, and at times has reached a maximum of 375 gallons per capita. Sanitary conditions are safeguarded by a health department to which is delegated great power. Inspection of all public and private properties is regularly and carefully made. The mortality record for 1915, based on a population of 250,000, was 1.36.

Public Buildings.— Among the notable public buildings of the city are the State Capitol and Federal building; the first, constructed of Colorado granite, cost $2,700,000; the second, of Colorado white marble on strictly classic lines, cost $2,400,000; the Federal building houses the Federal courts, post-office and other government offices. The United States Mint cost $1,225,000. During 1915 it received in gold and silver bullion $34,842,618, of which $574,175 was gold. Of the total receipts Colorado smelters and mills furnished $14,303,768. No gold was coined in 1915; $1,987,175 was coined into half-dollars, quarters and nickels; 220,500 pennies were coined. The mint, according to the United States Treasurer, contained on 6 July 1916 $485,000,000. Among other public buildings are the union railroad station costing $1,000,000, two museum buildings, public library, public baths, city hall, county court-

DENVER, COL.



The Business Portion of Denver, from the State Capitol



DENVER, COLORADO

house, armories, schools and colleges. A stock-show stadium has a seating capacity of 7,500 and cost $250,000. An auditorium, erected and controlled by the city, has a seating capacity of 12,000 and is so arranged that it can be re-adjusted temporarily for smaller gatherings, for theatre, concert and other purposes.

Banks, Public Finance.— Denver's banking and financial institutions are strong. The five national banks report combined capital and surplus for 1915 as $7,103,386; national bank clearings, $508,421,052; deposits, $67,606,781; loans and discounts, $34,030,906. Total number of banks, 36. The assessed valuation of the city in 1915 was $358,365,823; bonded indebtedness, $1,564,350, with sinking fund $855,096, leaving net bonded indebtedness $709,254; indebtedness per capita, $2.88; annual tax levy, 16.2 mills on the dollar; property assessed at its full cash value; number fire alarms, 1,057; number fires, 908; loss by fire, $244,354; number of persons per policeman, 1,072.

Parks, Public Playgrounds.— The city has 30 parks and 10 playgrounds. Those lying strictly within the municipal limits comprise 1,318 acres. They contain bronze and marble statuary and all floral adornment known to the modern scientific landscape artist, lakes and fountains, pavilions for musician entertainments where the municipal band of 50 pieces gives daily concerts during the summer (in winter the concerts are given Sundays in the municipal auditorium), floral-bordered walks, wide-surfaced drives, municipal golf links, tennis courts, camping grounds for automobile tourists, bathing beaches and playgrounds with modern equipment and competent supervision and instruction. A natural history museum is located in City Park, also a zoological garden well stocked with native animals and birds. Another feature of this park is the electric fountain, which plays every summer evening with varicolored lights. The connecting system of parkways about the city includes 12 miles of parking, with gardens, lawns and floral decorations, altogether embracing 56 acres. Denver owns in the mountains within 30 miles from the corporate limits parks comprising 2,530 acres, to which more is being added from year to year. These mountain parks include cañon and peak, to reach which a highway has been constructed by way of Lookout Mountain to the summit of Genesee Peak, rising to an altitude of 8,270 feet. The mountain roadways are at no point less than 20 feet in width and their grade more than 6 to 100 feet, and wherever necessary are guarded by post-and-cable protection. Rustic shelters and rest stations where refreshment may be had, fireplaces for cooking, etc., are conveniently located for parties who motor over part or all of the 72 miles of highway. A mountain pasture stocked with elk and buffalo lends to the attractiveness of the parks, while trout streams lure the city dweller and the tourist. These parks are maintained by the city of Denver for the free use of its citizens and guests, and provide unique and pleasurable rural excursions and mountain outings. The round trip from Denver by automobile over one of the most popular routes is accomplished in four hours. From various points on the trip the city is in full view, and with a glass its streets, buildings and parks are distinctly recognized. From these summits at night the view of the distant brilliantly lighted city is enchanting. In 1915 the city spent on the maintenance of its parks $233,000, and on improvements including mountain parks $160,000.

Schools, Libraries, Etc.—The public schools provide free education for all from the kindergarten through the high school, 15 years. In addition to the elementary fundamental branches, night schools are provided for adults of all nationalities; manual training, special training in cooking and sewing, modern and ancient languages, music, drawing, trade schools with special preparation for advanced work in technical schools and military training. In 1915 $1,463,000 was expended for the maintenance of public schools. The school property is valued at $4,260,000. The public library contains 100,000 volumes; five branches of this library are maintained at various points in the city. In addition there is a medical library of several thousand volumes; six law libraries; school libraries containing 60,000 volumes exclusive of textbooks; at the State Capitol a library numbering approximately 15,000 volumes. Denver has four daily newspapers, 35 weekly papers and a number of trade journals. Its church edifices number over 200.

Climate.— The climate is one of the most delightful and remarkable in the country. United States Department of Agriculture data for the years 1872 to 1915 give the following information: Discarding fractions of a degree, the mean annual temperature at Denver is 50° as against 49° at Chicago, 49° at Boston, 55° at Washington, 56° at Saint Louis and 69° at Jacksonville. During the last 44 years 100° or higher has been touched 13 times, 7 in July and 6 in August. While these high temperatures were maintained for only a few minutes, readings in the 90's are common during every summer month. For July, the warmest month, the average temperature is 72°, and the average daily maximum, or afternoon reading, is 86°. Here, as elsewhere over the greater part of the United States, the coldest month is January, with an average temperature of 31°. The annual precipitation is 14.5 inches; Chicago, 33.2; Saint Louis, 40; Washington, 42.7; Boston, 41.8; and Jacksonville, 54.1. Of sunshine Denver has 67 per cent of the possible, as against 65 at Saint Louis, 57 at Washington, 54 at Boston and 58 at Chicago. The average relative humidity is 52 per cent. It is highest in February, 57 per cent, and lowest in October, 49 per cent. Twice during the last 42 years a humidity as low as one-half of 1 per cent has been recorded. The annual relative humidity at Saint Louis is 70 per cent, Boston 72, Washington 73, Chicago 74 and Jacksonville 80; and for the warmer months — June, July, August and September — at Saint Louis 66 per cent, Chicago and Boston 74, Washington 76 and Jacksonville 82. It will be observed that in the Atlantic States the humidity during the warm months is greater than the average annual, just the reverse of that which obtains in Denver. In brief, Denver summers are characterized by warm days and cool nights, the heat of the day not attended by the usual debilitating effects; the winters by an abundance of sunshine and general absence of snow and severe, long-continued cold.

Railroad Service.— The railroad lines entering the city are the Atchison, Topeka and Santa Fe, the Chicago, Burlington and Quincy, the Chicago, Rock Island and Pacific, the Colorado Midland, the Denver and Rio Grande, the Union Pacific, the Colorado and Southern, the Denver and Salt Lake and the Denver, Northwestern and Pacific. Of these, jointly with others, four continue across the continent, and the Denver and Salt Lake, now under construction, will make the fifth. The Union Pacific Railroad takes its passengers through Denver to the western coast by way of Cheyenne and Ogden; the Burlington and Rock Island transfer to the Union Pacific, Rio Grande or Santa Fe; and the Santa Fe, whose main line extends south of Denver across the continent through New Mexico and Arizona, makes southern connection for Denver. The greatest transportation enterprise of recent years, involving a six-mile tunnel through the Rocky Mountains, is the construction of the Denver and Salt Lake Railroad, by which the rail distance between Denver and Salt Lake City will be shortened 100 miles.

Commerce, Industries.— As a commercial centre Denver is increasing in importance each year, and a combination of natural conditions gives much promise to the city. In 1890 manufactured products totaled $30,000,000 and in 1915 $62,000,000. The wholesalers sold in 1915 $53,000,000 worth of goods. Foundry, railway and mining machinery are manufactured. Five flouring mills have daily capacity of 3,500 barrels. Four paint manufactories and one varnish factory have a total annual output of $1,125,000. Window and plate glass is not made in Denver, but mirrors and ornamental art glass made and jobbed in 1915 totaled $750,000. Denver is the distributing point for Colorado, New Mexico, Arizona, Wyoming, Idaho, Montana, Nebraska and Kansas. The paints and varnishes produced are especially adapted to dry climate use. The live stock interests of the West centre in the Denver Union Stock Yards and added packing plants; 425,000 head of cattle (chiefly Western) were received in 1915. The packing companies are at present (1916) increasing their capacity at a cost of half a million dollars; 768,421 head of sheep were received in 1915 and 341,501 hogs were handled at the packing plants. The live stock industry is growing rapidly and money to finance operations is easily obtainable. Denver's proximity to the mining and agricultural regions of the State has greatly assisted in its upbuilding. The gold production of Colorado for 1915 was $23,358,608; silver, $4,137,333; zinc, $13,545,212; lead, $3,629,524; coal, 8,537,775 tons; a total, excluding coal, of $50,489,943. Among the leading agricultural products of the State in 1915 were sugar beets, 1,254,913 tons of which were converted into 195,343 tons of sugar. The executive offices of the beet sugar companies, and of many other substantial industries, are in Denver.

Population.— The population in 1910 was 213,381. In 1916 it was estimated to be 253,000. It is more largely cosmopolitan than is usual in cities of like size. Representative citizens, while more largely from the northern States of the Union, are found from every State as well as from most European countries. Census returns of 1910 gave 25,300 of foreign birth and 4,000 of negro descent. Only the first generation of native Coloradoans have arrived at adult life.

History.— Denver was settled by gold seekers in 1858. The following year it was incorporated as a city by the provisional legislature and named in honor of Gen. J. W. Denver, the governor of Kansas. In 1861 it was reincorporated by the first Territorial legislature and became the capital of the Territory in 1867. In 1870, on the completion of the Denver Pacific and Kansas Pacific railroads, it was first connected with the older settlements of the Missouri Valley. The bibliography of Denver is found complete in the library of the Colorado Historical Society. The Denver Public Library also has a complete list of books and pamphlets relating to the history of the city from its foundation.

THORNDIKE DELAND,
Secretary of the Denver Chamber of Commerce.

DENVER, University of. This institution is the pioneer school of higher learning in Colorado. With the commencement of 1916 the list of graduates numbers more than 3,100, and the institution therefore leads all institutions in the Rocky Mountain country in service to society. Approximately 1,400 students are now in residence as candidates for degrees. There are some hundreds of additional students in Denver who are taking college work without seeking degrees. The departments are as follows: graduate school, extension college, extramural college, summer school, Warren Academy, law school, dental school, school of commerce, school of art, lecture department. The properties and endowments of the university now aggregate more than a million dollars in value. The General Education Board has made a conditional grant of a large amount for endowment exclusively on conditions which have been fully met. Within three years the university properties and endowments will aggregate more than a million and a half in value. The university is owned by the Methodist Episcopal Church. No religious test has ever been made for admission to any of the departments. The university is conspicuously the university for Denver, though it attracts students from nearly all the States in the Union.

DENYS, Nicolas: b. Tours 1598; d. Acadia 1688. He accompanied De Razilly to Acadia in 1632 and engaged in sedentary fisheries at Port Rossignol, now Liverpool Bay, Nova Scotia, receiving a grant from the Company of New France. His fort was seized by D'Aulnay Charnisay, lieutenant-general in Acadia, in 1647. In 1653 he received a grant from the French king of the coasts, estuaries and islands of the Gulf of Saint Lawrence, to which Newfoundland was afterward added. He established the headquarters of his fisheries first at Chedabucto (Guysboro Harbor, N. S.); then at Saint Peters, Cape Breton, where his buildings were destroyed by fire; and finally at Nipisiguit (Bathurst, N. B.). His 'Description and Natural History of Acadia' was published in 1672.

DEOBUND, dē'- or dā'ō-bŭnd, or **DEOBAND,** India, city in the Saharunpur district, United Provinces of Agra and Oudh; an ancient place, with manufactures of fine cloth and a grain trade. It has many temples and is much resorted to by pilgrims. Pop. 19,250.

DEODAND, dē'ō-dănd (*Deo dandum*, a thing to be given or dedicated to God), an obsolete legal term for anything that had directly caused a person's death, all such chattels being, by the old rule of the common law of England, forfeited to the king, to be devoted by him to pious uses, though often finding way to his privy purse. In all indictments for homicide, the grand jury specified the instrument that immediately caused the death, and its value, that the king might claim the deodand and distribute it «to appease God's wrath.» Though these forfeitures were originally incurred to the king, yet they were frequently granted to the lord of the manor or territory upon which the death happened. Deodands were abolished in 1846. There has never been anything analogous to this custom in the United States. Consult Blackstone, ‹Commentaries on the Laws of England.›

DEODAR, dē-ō-där' («divine tree», from the Sanskrit *devadaru*), a tree (*Cedrus deodara*), a native of the mountains of India, where it grows to the height of 100 feet and upward. It chiefly resembles the cedar of Lebanon in habit of growth and is probably a species of the same genus. The timber is among the most valuable grown in India. The name is rather freely applied to trees, especially to species of the *Coniferæ*. See Cedar.

DEODORIZER, a substance used for absorbing foul-smelling gases, or for substituting an odor which is pleasing for one that is disagreeable. Deodorizers are not disinfectants or antiseptics, and should not be confounded with them. They are of no use save to cover up disagreeable smells, and often do a great deal of harm by shutting people's nostrils to real signs of danger.

DE OFFICIIS, dē o-fĭs'ĭ-is (Lat. «of duties»), a treatise in three books by Cicero on moral obligations written about 44 B.C. It is addressed to his son Marcus.

DEOGARH, dē'- or dā'ō-gŭr, India, the name of several cities, of which the following two are the chief: (1) In Bengal, 170 miles northwest of Calcutta; it contains a group of Siva temples to which numerous pilgrims resort. Pop. 8,667. (2) In Udaipur, Rajputana; its chief attraction is an old palace. Pop. 7,400.

D'EON DE BEAUMONT. See Eon de Beaumont, Charles.

DEOPRAYAG, dā"ō-prą-yäg', or **DEVAPRAYAGA,** India, village of Tehri, United Provinces, at the juncture of the Alaknanda and the Bhagirathi, which form the Ganges. It is 2,265 feet above sea-level. It is a place of pilgrimage for the Hindus and has a magnificent temple of Raghunath, built on a high terrace. The permanent population, about 1,000, is made up mostly of Brahmins.

DE ORATORE (Lat. «on the orator»), a rhetorical work by Cicero, in three books, written about 55 B.C. It is in the form of a dialogue, the principal characters being L. Crassus and M. Antonius. It outlines the studies necessary for a public orator to pursue, the composition, form and method of delivery of effective speeches. The work ranks with the most finished productions of Cicero on account of its varied contents and its excellent style.

DEPARTMENT, the name given certain territorial divisions of countries, especially to the principal territorial divisions of France. At the time of the French Revolution, when the former division of the kingdom into provinces was abolished and succeeded by a division of it into departments, this division was determined partly by the number of inhabitants, partly by extent of territory and partly by the amount of direct taxes. The new division was proposed in the Constituent Assembly in 1789 and effected in 1790. The whole kingdom was at first divided into 83 departments, which were subsequently increased by the gradual extension of the empire to 130, and were reduced by the Peace of 1814 to 86. By the cession of Savoy and Nice to France in 1860 the number of the French departments was increased to 89, and by the cession of Alsace-Lorraine to Germany in 1871 the number was reduced to 87. At the head of each is a prefect, appointed by the President of the Republic, and assisted by a *conseil de préfecture*. Most of the states of South America are also divided into departments (*departimentos*), but these resemble the French ones in nothing but the name. Each French department is subdivided into arrondissements, these again into cantons, and these again into communes. The name is, also, applied to military divisions and to various other divisions, as of government and schools.

DEPARTURE, a nautical term signifying the distance along a parallel of latitude measured in nautical miles, especially the distance made by a ship in a course due west or due east. When the course is other than east or west *departure* is the distance sailed × sine of course. Taking a departure is determining the exact position of a ship on the outset of a voyage and after leaving port.

DE PAUL UNIVERSITY ACADEMY, an institution for the secondary education of boys at Chicago. It was founded in 1898 and is conducted by the Vincentian Fathers. Its courses are given for entrance into college, for business training, and general education. The De Paul High School for Girls is under the direction of the Sisters of Charity.

DE PAUW, dė-pâ', **Washington Charles,** American manufacturer: b. Salem, Ind., 4 Jan. 1822; d. New Albany, Ind., 5 May 1887. He received a liberal education; worked himself up to the foremost rank among the business men of his State; and was successively a mill-owner, a merchant and a banker. He was noted for his extensive gifts in behalf of education. His aid to the Indiana Asbury University set it upon a sound basis, and its name was changed to De Pauw University in his honor. He also founded De Pauw College for Women and several charitable institutions at New Albany, Ind. See De Pauw University.

DE PAUW UNIVERSITY, a coeducational institution in Greencastle, Ind.; founded in 1837, under the auspices of the Methodist Episcopal Church, and known as the Indiana Asbury University until 1884, when the name was changed to De Pauw University. In the original charter of the institution there existed provisions for schools of divinity, law, medicine, art, music and pedagogy, and of liberal arts. At some period in the course of its existence the university has instituted and conducted every one of these. Insufficient endowment and income rendered it impossible to keep these professional departments up to the standard which the institution set itself and it suspended all except the school of music, thus leaving only the college of liberal arts and this school in operation at present. In 1915 there were in attendance 883 students with 40 professors and instructors; number of volumes in library, 27,725; grounds and buildings valued at $528,000; productive funds, $1,200,000.

DE PERE, dė-pēr′ or dė-pār′, Wis., city in Brown County, on the Fox River at the head of steamer navigation, and on the Chicago and Northwestern and the Chicago, Milwaukee and Saint Paul railroads, about 100 miles north of Milwaukee. Here was established the first mission in Wisconsin. Saint Norbert's College is situated here. The parts of the city on either side of the river are united by means of a steel bridge over the river. The industrial establishments of the city include brick, pottery and tile works, paper mills, boiler works, internal combustion engines, sash and door factories, flour mills, cigar factories, boat works, foundries, woolen mills, creameries, limestone quarries, and municipal waterworks. The city exports principally cattle, grain and hay. Pop. 4,447.

DEPEW, Chauncey Mitchell, American lawyer, legislator, politician and orator: b. Peekskill, N. Y., 23 April 1834. He was graduated from Yale College in 1856, studied law in Peekskill and in New York and was admitted to the bar in 1858. He was soon after elected to the New York assembly and served as chairman of the committee on ways and means. For a time he was acting speaker of the house. In 1863 he was nominated upon the Republican ticket for secretary of State and was elected by over 30,000 majority. In 1865 he declined a renomination. President Grant tendered him the Japanese mission about this time, but Dr. Depew declined the office to enter the service of the New York and Harlem Railroad as attorney. In 1869, when the consolidation occurred of the Hudson River, Harlem and New York Central railroads he was made a director and attorney for the newly organized company. In 1872 he accepted the nomination for lieutenant-governor on the Republican State ticket, but was defeated by a small plurality. In 1875 he became general counsel for the entire Vanderbilt system of railroads, and in 1882 second vice-president of the reorganized New York Central and Hudson River Railroad, and president in 1885. The same year Yale College conferred upon him the title of LL.D. During this period he was acting as a regent of the State University. He remained president of the New York Central until 1898, when he became chairman of the board of directors of the Vanderbilt system, which included the New York Central and Hudson River, Lake Shore and Michigan Southern, Michigan Central and the New York, Chicago and Saint Louis railroads. His political career during these later years was eventful. In 1885 he declined the election to the United States Senate. In 1888 he figured prominently as a candidate for the presidential nomination at the National Republican Convention, withdrawing from the contest in favor of Benjamin Harrison, of Indiana, who, after his election and elevation to the Presidency, tendered to Mr. Depew the portfolio of Secretary of State, which was declined owing to large railroad interests. In 1899, on 17 January, he was elected to the United States Senate as junior member from New York State. He remained in the Senate until 1911. He became involved in the investigation of certain New York life insurance companies in 1905, with the result that he repaid to the Equitable Life Assurance Society, of which he was a director, a loan made to a concern in which he was interested, and he resigned from the directorate of the Equitable. Since 1885 Dr. Depew has been regarded as one of the leading Republicans of the country. Dr. Depew was married in 1871 to Elise Hegeman, who died 1893, leaving one son. He was married again in 1902 to Miss Palmer. Dr. Depew's fame abroad is even greater than in the United States. In London and Paris he is regarded as America's representative citizen. This fame rests largely upon his ability as orator, after-dinner speaker and lecturer. He delivered important addresses at the Washington Centennial at New York in 1889 and the dedication of the World's Columbian Exposition, at Chicago, in 1893, and orations at the memorial services of President Garfield and General Sherman. As a wit and humorist, Dr. Depew has acquired a name second to none in this country, and he has been in great demand for many years at annual dinners and banquets as the chief after-dinner speaker. He has published collections of his orations and after-dinner speeches in one volume (1890), and his later speeches (1894). Consult Clemens, ‹Depew Story Book› (1898).

DE PEYSTER, dė pīs′tėr, **Abraham,** American merchant: b. New York, 8 July 1658; d. there, 10 Aug. 1728. He was the eldest son of Johannes DePeyster (q.v.); and filled many important public offices after the final cession of the New Netherlands to Great Britain. Between 1691 and 1695, he was mayor of New York, and subsequently became chief justice of the province and president of the king's council, in which latter capacity in 1701 he acted as colonial governor. He was also colonel of the forces of New York and treasurer of the provinces of New York and New Jersey. A statue has been erected to him in Bowling Green, New York city.

DE PEYSTER, Arent Schuyler, British military officer: b. New York, 27 June 1736; d. Dumfries, Scotland, November 1832. He was a grandson of Abraham DePeyster (q.v.). In the American Revolution he was a colonel in the Royal army; was at different times in command of the British posts of Detroit, Mackinac and elsewhere in Canada.

DE PEYSTER, Johannes, American colonial merchant: b. Haarlem, Holland, 1600; d. New York about 1685. He was one of the early settlers of New York; and became prominent in public affairs during the Dutch possession; was one of the last to swear allegiance to the Crown after the English succeeded to the government; served several times as alderman and deputy mayor, and was frequently urged to become mayor by the English residents, but declined from ignorance of the language.

DEPILATORIES («I pull out the hair»), applications used to remove the hair from the body, especially the face and scalp, without injuring the texture of the skin. Quicklime, caustic alkalis, arsenic barium sulphide and orpiment are the most common ingredients. The most celebrated depilatory is the *rusma,* used by Oriental nations, which consists of quicklime and orpiment (trisulphide of arsenic) boiled in water impregnated with a strong alkaline lye. The parts which are to be deprived of hair are rubbed with this mixture, and after a time washed in warm water. This depilatory acts with great energy, and the utmost care is necessary in using it that it may not irritate and injure the skin. Sometimes a plaster of pitch and resin is used for the same purpose. The best and most effective means of removing the hair to-day is by means of a galvanic current, and needle electrode, which is applied directly to the hair-follicle, thus killing it. This procedure is sometimes called electrolysis. There are few depilatories that are free from all chance of poisoning, and none that are not liable to leave a scar unless used with the utmost care.

DEPONENT, (1) in Latin grammar, a verb which is passive in the conjugation of its tenses, but active in meaning. The old grammatic fiction was that such a verb laid aside (*deponens,* laying aside) its passive meaning. These verbs were originally reflexive. (2) In law, a person who depones or makes a deposition; one who gives his testimony in a court of justice; a witness upon oath. See DEPOSITION.

DEPOSIT, in geology, a layer of soft or hard matter formed by the settling down of mud, gravel, stones, detritus, organic remains, etc., which had been held in suspension in water. Marine deposits are those formed on sea bottoms; lacustrine, those formed at the bottoms of lakes; fluviatile, those formed on river bottoms; and so on. In contradistinction to bed or layer, which is matter more evenly distributed during formation, a deposit is nearly always irregular in form. See GEOLOGY.

DEPOSIT, a term of wide meaning in law, but especially applied to money paid as an earnest or security for the performance of a contract; also to money or goods belonging to one person entrusted to the safe-keeping of another, to be kept without fee, and to be redelivered on demand. When such a deposit is made to a bank or trading company, interest, according to agreement, is generally paid on it. The person who makes the deposit is called the depositor and the person who receives the deposit is called the depositary. An irregular deposit arises where one deposits money with another for safe-keeping, in cases where the latter is to return, not the specific money deposited, but an equal sum. A quasi deposit occurs where one comes lawfully into possession of the goods of another by finding. By the civil law, deposits are divided into two classes, necessary and voluntary. The first class is where the depositor is compelled by some sudden emergency, such as fire or shipwreck, to confide his property to some one, without having opportunity for choosing his depositary. The second class is where the deposit is made by the mutual consent of the parties. Besides such deposits of money received by banking or commercial companies with a view to employing it in their business, a merchant or commercial company frequently deposits with a bank documents, such as deeds or bonds, as security for the payment of a loan. The civil law again divides deposits into simple deposits and sequestrations: the former is when there is but one party depositor (of whatever number composed) having a common interest; the latter is where there are two or more depositors, having each a different and adverse interest.

DEPOSIT CURRENCY. See CURRENCY.

DEPOSITION, (1) *in law,* the testimony of a witness reduced to writing in due form of law, by virtue of a commission or other authority of a competent tribunal, or according to the provisions of some statute law, to be used on the trial of some question of fact in a court of justice. In criminal cases, depositions cannot be used without the consent of the defendant, in most of the States; in some provision is made for the taking of depositions by the accused. An act of Congress and various statutes provide for taking depositions in civil cases. The privilege of deposition is granted to witnesses living more than 100 miles from the scene of the trial; to very old or infirm persons, or by reason of sickness, imprisonment or being bound to a voyage at sea; or undertaking a journey out of the United States. All witnesses granted deposition must be duly sworn before committing evidence to writing.

(2) *In ecclesiastical law,* the act of depriving a clergyman, by a competent tribunal, of his clerical orders, to punish him for some offense, and to prevent his acting in the future in his clerical character.

DEPOSITION OF METALS. See ELECTROPLATING.

DEPOT, dē'pō, Fr. dā-pō, a French word in general use as a term for a place where goods are received and stored; hence in military matters a magazine where arms, horses and mules, ammunition, etc., are kept, or where recruits are sent for assignment and preliminary training. The term is now usually applied to those companies of a regiment which remain at home when the rest are away on foreign service. In the United States it is the common term for a railway station.

DEPRAVITY. A theological doctrine which has been the subject of much discussion. The Calvinists held that because of the fall of man our depravity was total, involving even the bondage of the will and an inability to do any spiritual good. On the other hand, the teaching of Arminianism was that depravity was only a bias, which was entirely nullified by belief in the efficacy of salvation in Christ. The freedom of the human will and the consequent right of choice determines the continuation of depravity.

DEPRÉS, dė-prā, **Josquin,** Flemish composer: b. Hainault, about 1450; d. Condé, 27 Aug. 1521. But little is known of his personal history. He studied probably under Ockegehem and was choir-boy and later chapel-master at Saint Quentin. He went to Italy, where he remained for several years at the court of Pope Sixtus IV and visited all of the great courts of the world. His contemporaries regarded him as the foremost composer of his times. His work forms the connecting link between Ockegehem and Lassus and Palestrina. His principal service to music was in the development of counterpoint and in the adaptation of musical themes to the words of the piece. He left 32 masses, which were partly edited by

Petrucci, and fragments have since been published. The Sistine Chapel possesses a number of manuscript fragments. The *Gesellschaft für Musikforschung* published selected pieces in modern notation (Berlin 1877). Consult Eitner, 'Bibliographie der Musiksammelwerke' (1877); Menil, 'Josquin de Près' (in *Revue Internationale de Musique*, No. 21, Paris 1899).

DEPRETIS, dā-prā'tēs, **Agostino**, Italian statesman: b. Mezzana-Corte-Bottaroni, near Stradella, 31 Jan. 1813; d. there, 29 July 1887. He studied and practised law in Turin and in 1848 was elected to the Piedmontese Chamber, there supporting the opposition. He was most prominently identified with Italian politics from 1849, when he was made civil governor of Brescia, and in 1861 was sent to Sicily as prodictator for Garibaldi. He served in a number of the Italian ministries, beginning in 1862 as Minister of Public Works under Rattazzi. Under Ricasoli in 1866–67 he was Minister of Marine and afterward held the portfolio of Finance. In 1876 he was called to form a ministry himself, and while acting as President of the Council and Minister of Finance he instituted many reforms in the government. In 1879 he resigned and Cairoli formed a government, but Depretis was again placed at the head of the Council in 1885 and remained there until his death. In 1893 a monument was erected in his honor at Stradella.

DEPREZ, dẹ-prā', **Marcel**, French engineer and pioneer electrician: b. 1843. In 1872 he conducted an extensive series of experiments in electric power transmission and 10 years later succeeded in transmitting electric power 35 miles by telegraph wire between Munich and Miesbach. This is considered the first successful experiment in the transmission of electric power through a considerable distance. Later he conducted many other successful experiments on the line of the Northern Railway of France. He became professor of electricity at the Conservatoire des Arts et Métiers and professor of physics at the Collège de France. He is a member of the Academy.

DEPRIVATION, the removing of a clergyman from his benefice on account of heresy or misconduct. It entails, of course, loss of all emoluments, but not the loss of clerical character, except it be *deprivatio ab officio*, or deprivation of office, which then becomes deposition (q.v.) or degradation. The lighter punishment, simply taking away a clergyman's living or preferment, is called *deprivatio a beneficio*.

DE PROFUNDIS, the 130th of the Psalms of David (129th in the Douay version); one of the seven psalms expressive of sorrow for sin and desire for pardon used in the liturgy of the Roman Catholic Church and called the Penitential Psalms. The name De Profundis comes from the Latin version of the first words of the psalm, "Out of the Depths." See PENITENTIAL PSALMS.

DEPTFORD, dĕt'fērd, England, a metropolitan and parliamentary borough of southeast London. In the reign of Henry VIII a dockyard was established in this place, then known as Deptford Strond. It was in this dockyard that Peter the Great of Russia served as an apprentice and learned shipbuilding, 1691. It was from Deptford that Captain Cook sailed in command of the *Resolution* and *Discovery* on his last voyage (1776). The London cattle market occupies the site of the old dockyard. The Royal Victoria Victualling Yard, the largest army and navy supply depot, is located here. Deptford has important engineering, chemical and earthenware manufactures. The borough returns one member to Parliament. Pop. 109,-496. Consult Dews, 'History of Deptford' (1889).

DEPUTIES, Chamber of, the lower of the two legislative chambers or second house of national parliament in France, Italy and Rumania. The first French Chamber of Deputies was established under Louis XVII in 1814. By enactments introduced in 1830 any citizen of 30 years and upward who paid direct contributions to the extent of 500 francs might be elected as a deputy. Originally the Chamber was elected for five years; in 1824 it became septennial and in 1830 it was again limited to five years. In France (1917) the Chamber of Deputies is elected for four years by manhood suffrage, and each citizen 21 years old, not actually in military service, who can prove a six months' residence in any one town or commune, and not otherwise disqualified, has the right of vote. Deputies must be citizens and not under 25 years of age. The manner of election of deputies has been modified several times since 1871. The *scrutin de liste*, under which each elector votes for as many deputies as the entire department has to elect, was introduced in 1871. In 1876 it was replaced by the *scrutin d'arrondissement*, under which each department is divided into a number of *arrondissements*, each elector voting for one deputy only; in 1885 there was a return to the *scrutin de liste*, in 1889 the uninominal vote was reintroduced. In 1889 it was enacted that each candidate is bound to make, within the fortnight which precedes the elections, a declaration as to his being a candidate for a given constituency, and for one constituency only — all votes which eventually may be given for him in other constituencies being reckoned as void. In each constituency the votes are cast up and the deputy proclaimed elected by a commission of councillors-general appointed by the prefect of the department. The Chamber in 1917 was composed of 602 deputies; each *arrondissement* elects one deputy, and if its population is in excess of 100,000 it is divided into two or more constituencies. The Chamber assembles every year on the second Tuesday of January, unless a previous summons is made by the President of the Republic, and must remain in session at least five months out of the 12. Deputies are paid $3,000 a year and the President of the Chamber receives in addition $14,400 for the expense of entertainment. Deputies travel free on all railways by means of a small annual payment.

In Italy the number of deputies is 508, elected for five years, unless the Chamber is dissolved by the king, and chosen by almost universal suffrage. Deputies must be 30 years old and must receive a number of votes greater than one-tenth of the total number of inscribed electors, and than half the votes given. All deputies receive $400 annually, to cover expense for correspondence. An additional payment of $800 annually is made to those deputies who receive no income from any public funds whatsoever. All deputies travel gratis on the railroads.

In Rumania the Chamber of Deputies consists of 183 members, elected for four years. Deputies must be 25 years of age, and receive $4 for each day of actual attendance besides free railway passes.

DEPUTY, a lieutenant or substitute who exercises power which properly belongs to another who has placed him in his stead. The appointment of a deputy does not free the principal from responsibility. A deputy must take an oath of office. His salary is paid by the government. If authorized for the time being to act with full power of his principal he is called a general deputy and may act in his own name. Otherwise, when acting in a particular and limited matter, he is only a special deputy. Generally deputies may be appointed only by administrative and executive officers.

DE QUINCEY, Thomas, English miscellaneous writer: b. Manchester, England, 15 Aug. 1785; d. Edinburgh, 8 Dec. 1859. In a striking sense, DeQuincey's life and writings are distinct; for by far the most interesting events in his life took place before 1821, the year of his first publication, after which the course of his life is of an interest wholly secondary to his writing. He was the son of Thomas DeQuincey, a well-to-do merchant, of a family that had come to England with the Conqueror. His mother was a Miss Penson, a lady of quality. He was the fifth child and second son among eight children of diverse temperaments. Most of his youth was spent at Greenhay, an estate near Manchester, where, though dominated by the will of an imperious older brother, his life was that of a shy, sensitive child, of lively imagination, and with a great love for mysterious and fanciful literature. After studying with a private tutor, he was sent to school at Bath, where he distinguished himself in Latin and Greek, and, in 1800, after a visit at Eton and a ramble in Wales with his friend, Lord Westport, to the Manchester Grammar School, to the end that he might prepare for Brasenose College, Oxford. A year and a half, however, was all that he could stand of a régime which deprived him «of health, of society, of amusement, of liberty, of congeniality of pursuits and which, to complete the precious picture, [admitted] of no variety.» Early one morning in July 1802, he ran away from his master's house, and for nearly a year lived a vagrant life. For some months he roamed about North Wales, with the knowledge of his mother and the support of his uncle, but in November he cast away this support and went to London. Here, according to his own account, he endured many hardships, was frequently obliged to sleep in the streets, to share the lot of vagrants like himself, and to resort to money-lenders for support. Through the aid of one of the latter he was finally discovered by his family. In the fall of 1803 he was sent to Worcester College, Oxford, and here he remained off and on till 1809, but never took a degree. Though little in particular is known about his life at the university, he was distinguished as an admirable Greek scholar and read prodigiously in English literature and German metaphysics. His feeling of superiority and his desire for privacy, together with a straitened income, were the reasons for his seclusion. Leaving Oxford in 1809, he went to live at Grasmere in order to be near Wordsworth and Coleridge, and in the Lake region he remained almost continuously till 1821. His life here was a very studious one, in which the most conspicuous determinant was the confirmation of his habit of opium taking. He had first experimented with the drug in 1804, at Oxford, as a relief for an attack of neuralgia, and thereafter, until 1813, took it systematically at intervals of two or three weeks simply for the pleasure that it gave. In the latter year, however, he «was attacked,» as he says, «by a most appalling irritation of the stomach, in all respects the same as that which had caused me so much suffering in youth, and accompanied by a revival of the old dreams.» It was then that he began taking opium regularly and in large quantities. To some extent he broke the habit at the time of his marriage, in 1816, to Margaret Simpson, the daughter of a farmer in his neighborhood, but the general effect was great prostration of his will, and, though in later years, he had the habit under control, he probably never altogether shook it off. It was some time before he could bring himself to do anything. His first piece of active work, after the failure of his attempt to write a philosophical work, 'De Emendatione Humani Intellectus' and an unfinished 'Prolegomena to all Future Systems of Political Economy,' was the editorship of the *Westmoreland Gazette,* which office he occupied about a year, 1819–20. The chief result of all this was to stimulate in him a desire to write, and in September 1821 he published in the *London Magazine* the first part of his most striking and popular work, 'The Confessions of an Opium-eater, being an Extract from the Life of a Scholar.'

Then began the prolific course of writing which has made DeQuincey the prince of magazine writers. It is unnecessary, from this point, to trace his career in detail. The main facts up to his death are that from 1821 to 1825 he lived chiefly in London, where he wrote a great deal for the *London Magazine.* Then he returned to Grasmere, whence he contributed largely to *Blackwood's Magazine.* In 1830 the editor, his friend John Wilson («Christopher North,» q.v.), induced him to settle in Edinburgh, and here and at the suburb, Lasswade, he remained till his death. His articles appeared chiefly in *Blackwood's,* in *Tait's Magazine,* and, latterly, in *Hogg's Weekly Instructor.* His life was a very secluded one. Stories are told of his eccentricities and his absent-mindedness. His quiet was disturbed only by the death of his youngest daughter and his wife. For 20 years at Edinburgh he was obliged to support himself and his large family by his pen, but toward the last decade, legacies enabled him to live in more ease and to give his thought to a complete edition of his collected writings, of which the first volume appeared in 1853.

DeQuincey's published work contains about 150 titles, representing articles varying in length from the moderately long novel 'Klosterheim' (1832), and the historical picture 'The Cæsars' (1832–33), to short sketches such as 'On the Knocking at the Gate in Macbeth' (1823), and 'English Dictionaries,' an incomplete note. In these articles he entered the fields of personal experience, reminiscence of personal acquaintance (chiefly of members of the «Lake» group), biography (principally English), criticism, history (largely classical, and, if modern, that of out of the way bits of information), philosophy (chiefly by way of expounding well-known men), theology (by way of argument for orthodox Christian doctrine), economics (exposition and defense of Ricardo), and, more slightly, politics, natural science, linguistics, ethics, æsthetics and fiction. A more compact arrangement of his works, that adopted by Prof. David Masson, is into autobiography, literary reminiscence and confessions; biographies and biographical sketches; historical essays and researches; speculative and theological essays; political economy and politics; literary theory and criticism; and tales, romances and prose treatises; with some miscellanea chiefly in the form of imaginative prose.

In almost all these classes DeQuincey achieved great, though unequal, success. Popularly, he is best known by the writings in which he exploited his own life and by the dream prose which resulted from his habit of opium-eating. The ‹Confessions› is naturally his best known work, but scarcely less in interest are his autobiographical sketches. In all these he reveals himself with singular intricacy and freedom. His dream prose, which has done probably more than any other of his writings to make great his name as a stylist, is best represented by such remarkable pieces as ‹Suspiria de Profundis› (1845), of which the most famous is «Levana and the Ladies of Sorrow.» All of them are illustrations, as it were, of the states of mind which he describes in the ‹Confessions.› Much of the same sort of value attaches itself to the less sensational sketches of his contemporaries, and the instinct of self-revelation is here tempered by the addition of brilliant analyses of the characteristics of his great contemporaries for whom he had an intellectual fondness.

Much of DeQuincey's dream prose is sometimes included under the head of his narrative writing. His best narrative certainly has the qualities of his imaginative work. In this class are to be found his brilliant ‹Three Memorable Murders› with its introductory extravaganza, ‹Murder Considered as One of the Fine Arts› (1826-27), ‹The Spanish Military Nun› (1847), and what is probably, all in all, his masterpiece, ‹The English Mail-Coach› (1849). Several of these narrative pieces, like the excellent ‹Flight of a Tartar Tribe› (1837), may more properly, as regards subject, be classed as historical writings. In all these DeQuincey is always brilliant and successful. The same, however, cannot be said of his attempts to write stories and novels. His essays in this field were all comparatively early, took the form of melodramatic, supernatural tales, like ‹The Fatal Marksman› (1823), translations from the German, like ‹The Dice› (1823), or of long turgid romances, like ‹Klosterheim› (1832), and ‹The Avenger› (1838).

Of as great importance as the analytical and narrative papers, though not so popularly known, are the biographical and the critical writings. These are hard to separate into distinct classes. DeQuincey was too much interested in analysis to be a strictly good biographer, and whereas the essay on Shakespeare (1838), for example, is mainly biographical, it rambles into minute questions and contains much matter of a purely critical sort. On the other hand, much of his critical work is in no sense biographical; such are his well-known essays on ‹Rhetoric› (1828), and ‹Style› (1840-41), and the numerous paradoxical statements of critical theory with which he frequently enlivened the pages of contemporary reviews. As good examples as any of his idea of biography and criticism may be obtained from his various essays on Pope. That of 1837 is chiefly biographical; those of 1848 and 1851 are critical, and the last, ‹Lord Carlisle on Pope,› characteristically takes the form of dissent from an accepted view. For the most part his biography and criticism deals with English writers; outside of them, Germany is his favorite field.

DeQuincey's historical writings, in like manner, are hard to divide, and may best be treated together. Many of them, like ‹The Spanish Military Nun› and ‹The Flight of a Tartar Tribe,› are narrative and deal with extraordinary events. He is, however, more likely to be interested in the philosophical aspect of history, as in ‹The Philosophy of Roman History› (1839). The best known of his writings of this class, and indeed his most ambitious piece of work, is the unfinished ‹Cæsars› (1832-33), in which he desired «simply to characterize the office of Emperor, and to notice such events and changes as operated for evil, and for a final effect of decay, upon the Cæsars or their empire.» It is really an attempt to present a general view of «the sublimest incarnation of power, a monument of the mightiest of greatness built by human hands, which upon this planet has been suffered to appear.» DeQuincey's more strictly philosophical writings, including his discourses on economics and theology, are also numerous. They are mainly serious, discriminative, analytical and paradoxical in tone and manner. Typical examples are ‹On Hume's Argument against Miracles› (1839), ‹Casuistry› (1839), and ‹Judas Iscariot› (1853).

In general, in all these writings, DeQuincey deals chiefly with intellectual conceptions and is concerned with objects only to a comparatively slight degree and for an ulterior purpose — that of showing the underlying subtlety. The apparent exceptions to this generalization lie in his descriptions of particular people, like Wordsworth, the particular scenes of such an essay as ‹The English Mail Coach,› and the narration of historical events, all of which are, however, subordinated to an underlying «idea.» Furthermore, the purpose of DeQuincey's writing, so far as one can see, is much more intellectual than moral, though it may have secondary moral effects. Curiosity is his animus — the desire to present some new body of facts or ancient facts in a new and strange light. He enjoys what might be called intellectual sensation and loves to delve and burrow into the recesses of experience. He has frequently been called an «intellectual hedonist» and that term as well as any sums up the vast range as well as characterizes the attitude of the author toward his subjects. The main fact is that he deals in distinctions, that his interest lies in intellectual phenomena, and that he is appealed to by the logic of situations.

DeQuincey differs strikingly from such writers as Shakespeare, Addison, Johnson and Lamb, in that it is impossible to trace him through any period of apprenticeship before coming to his own. Rather he is like Swift, in that he took to publishing rather late, jumped at once into success and continued pouring out work of striking quality. Like Swift, DeQuincey, once embarked, knew no let or hindrance to the course of his expression. Unlike Swift, however, he never took an active interest in affairs and his writing is in no wise concerned with the practical movements of the time. Hence the course of his life after 1821 is, from the point of view of his work, unimportant, and any account to the last 39 years is an account of the interests of his mind. These were so varied that it is impossible to trace the history of his mind with any definiteness, but a few observations may be made. If anything, the decade between 1841 and 1850 is the most prolific, and on the whole represents the climax of his activity. In that decade, too, the prevailing interest is mainly in philosophy and criticism, whereas the preceding 10 years were particularly rich in history and biography. On the whole, setting aside such a striking performance as the ‘Confessions,’ there is a tendency toward originality. His criticism and philosophy are less formal and less of the nature of summary, while it is especially to be noted that, in narrative, his adaptations of German tales and his own German-bred romances gave place to such original pieces as ‘The English Mail Coach’ and ‘The Spanish Military Nun.’ There is in the decade between 1841 and 1850 much reversion to the original type of the ‘Confessions.’ Probably the fact that De Quincey did a good deal of hack work in the decade beginning with 1830, when he first established himself at Edinburgh, would account for the general inferiority of that decade to the following, and yet many of his best pieces belong there.

DeQuincey is usually regarded as among the English masters of prose style. The appellation, with regard to him, signifies a marvellous and unfailing command of means of expressing very minute shades of thought and feeling, combined with the power to write, on occasion, sonorously, grandly and very wittily. He is always discursive and intricate, to a degree almost unparalleled among masters of prose. As a critic he has few superiors, and as a thinker few masters in point of delicacy and exactness, but many in profundity. See Confessions of an Opium Eater, The; DeQuincey's Autobiographic Sketches.

Bibliography.— The best edition of his collected works is by David Masson (14 vols., London 1889–90). Separate editions of his more popular works are numerous. ‘Posthumous Works’ were edited by Japp (ib. 1891–93). Consult also ‘Lives’ by H. Page (2 vols., 1881); Masson (in ‘English Men of Letters Series’); Leslie Stephen (in ‘Dictionary of National Biography’); Findlay (London 1885). The best essays are by Saintsbury (in ‘Essays in English Literature,’ 1780–1860); Stephen (in ‘Hours in a Library’); Hogg, ‘DeQuincey and His Friends’ (1895).

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DE QUINCEY'S AUTOBIOGRAPHIC SKETCHES. What is commonly called ‘The Autobiography’ of Thomas DeQuincey is more accurately entitled ‘Autobiographic Sketches.’ This latter title suggests the mode of composition. DeQuincey did not deliberately plan and forthwith compose his autobiography. Rather he began by contributing reminiscent articles to periodicals, a practice which he continued until he had written and published about 30. In 1853, he collected these articles, revised, enlarged and polished them with his customary diligence, and gave them to the public under the title ‘Autobiographic Sketches.’ The reader must not suppose that all of De Quincey's autobiographical work is contained in these collected articles; the ‘Sketches’ must be supplemented by a large amount of other reminiscent composition, particularly by the ‘Confessions of an English Opium Eater,’ by ‘The English Mail Coach,’ and by that noteworthy series of papers included under the general title, ‘Suspiria de Profundis.’ In truth, all of these compositions might, with entire propriety, be included under the title ‘Autobiographic Sketches.’ As a matter of fact, the autobiography of DeQuincey, more than that of almost any other man, is fragmentary — a succession of sketches loosely connected and widely scattered. DeQuincey lived from early childhood in a dream-world; the record of his successive dreams constitutes the true inner autobiography of the man. He might have written an objective account of the outward events of his life and thus have attained a brevity and a form such as David Hume attained in his autobiographic sketch. Fortunately, DeQuincey did not do this, and, in consequence, we may know his spirit as we may know the spirit of only a few men. Apart from their value as a revelation of De Quincey's soul, the ‘Autobiographic Sketches’ are remarkable from a purely literary point of view. To be sure, they exhibit both the defects and the virtues of DeQuincey's style. At one time, we are carried rapidly on by the swift flow of the author's “impassioned prose”; at another, we are becalmed by sluggish, almost uninteresting narrative. In general, however, the style is of high quality and the narrative compelling. Few readers can ever forget DeQuincey's account of his visit “about an hour after high noon” to the chamber where his little sister lay dead; of the Sunday mornings when he went with his family to a “church having all things ancient and venerable, and the proportions majestic”; of his stay at “Oxford, ancient mother, hoary with ancestral honors.” The appeal of the whole series is strong, and it is the experience of most readers that they return to these ‘Sketches’ frequently to commune with the strange elfin spirit of DeQuincey; to pass under the spell of the “organ music” of his rhetoric; to feel something of that “mighty and essential solitude” which, in the words of the author, “stretches out a sceptre of fascination” for us all.

Waldo H. Dunn.

DER ARME HEINRICH, a courtly epic, written by the Middle High German poet Hartmann von Aue in the decade between 1190 and 1200. Its source is an unknown Latin work, probably the family chronicle of the lords of Aue to whose family Hartmann belonged. Differing from most of the knights of his time, he proudly boasted that he was able to read books, i.e., Latin books. He tells us, moreover, that he began to interpret a tale he found in writing. The poem relates the touching story of how Prince Henry was cured of the dread disease of leprosy by the devotion and sacrifice of a little girl. In the midst of worldly honors the prince had been suddenly smitten by leprosy, and, forsaken by all his courtiers and friends, took refuge in the house of one of his tenant farmers, whose little 12-year-old daughter cared for him tenderly. Henry in return soon became fond of her, gave her many presents, and called her in jest «his little wife.» Learning one day that her master could be cured by the blood of an innocent maid she determined to sacrifice herself. After much difficulty she obtained her parent's consent, and made the journey with the prince to Salerno. Henry, touched by her devotion and by her wondrous beauty, as she lay stripped upon the surgeon's table awaiting the fatal knife, refused to accept the sacrifice. On their homeward journey, however, his skin was restored to its former purity, and he rewarded the maid's devotion by making her his wife. The monkish origin of the piece is shown by the fact that this 12-year-old girl is prompted to her sacrifice mainly by the hope of winning heaven, and talks like a learned monk on the wickedness of this world and the raptures of heavenly bliss. The subject is a repulsive one, but with delicate tact Hartmann avoided all descriptions of the loathsome disease, and, as the poet Uhland once said, cast over the old legend so soft and subdued a light that it is one of the most charming tales of the Middle Ages. In modern times it has been worked up in English by Longfellow in his 'Golden Legend' and by Rosetti in 'Henry the Leper.' Many German writers have attempted to modernize the legend, the most important of whom are Gerhard Hauptmann in a verse drama and Ricarda Huch in a prose tale. Consult Tarbell, H., 'Der arme Heinrich in der neueren Dichtung.' The best German editions are those of Wackernagel-Toischer (Basel 1885); Bech (3d ed., 1891), and Paul, H. (2d ed., 1893). A good English edition is that of J. G. Robertson (London 1895).

Daniel B. Shumway.

DER GRÜNE HEINRICH, «Green Henry» (1854) is a psychic autobiography of G. Keller in the same sense and with the same limitations as 'Werther' or 'Wilhelm Meister' is of Goethe. Truth is freely mingled with fiction, and there is a generalizing purpose to exhibit the psychic disease that affected the whole generation of the transition from romanticism to realism in life and art. Green Henry, so named from the color that he affected in dress, was a Swiss burgher's son, brought up too tenderly by a widowed mother. After youthful pranks and experiences, told with delightful freshness, and a not altogether justified dismissal from school, he idles away some time in his mother's village in activities of which the description is far better worth while than was the reality. He determines to be a painter, and goes to Munich's artistic Bohemia, whence he finds his way to a count's mansion and thence home to his dying mother and an all-too-tardy and brief repentance. Abandoning art, he enters the civil service. This experience affords occasion for extended political reflections. The tone of the reminiscences makes it clear that Keller would have the reader understand that Heinrich has lived through and risen out of his instability and irresolution and sees life steadily and cheerfully at last. 'Der Grüne Heinrich' was slow in gaining recognition. A second edition was not called for till 1879. It has since won general and often extravagant praise. Keen insight, fresh humor and instinct for realistic narration are its outstanding merits; its faults are lack of proportion, occasional garrulity and obtruded moralizing, but most of all the doubt that it leaves in the reader whether the Heinrich who had shown such persistent lack of character, especially in his relations with his mother, would so quickly be capable of discovering, rather than recovering, a normal balance of mind.

Benjamin W. Wells.

DERA (a word derived from the Arabic «der,» a monastery), the name of several towns in British India, the two principal places so designated being (1) Dera Ghazi Khan, and (2) Dera Ismail Khan (qq.v.).

DERA GHAZI KHAN, dĕr′ą gä-zē′ kän, India, a district and a town in the Punjab, in the division of Multān. The district lies entirely on the right bank of the Indus, and consists of a sandy strip of low land shut in between the Suleiman Hills and the river. The town lies about two miles from the Indus, has many striking mosques, town-hall, courthouse, handsome bazaar, cantonments, etc. Pop. of the town 19,000.

DERA ISMAIL KHAN, ēs-mä-ēl′, India, a district and a town in the northwest frontier province, in the division of Derajat. The district lies north of that of Dera Ghazi Khan on both sides of the Indus, and is in great part barren and sandy. The town is situated four and one-half miles west of the Indus, and is the administrative headquarters of the Dera Ismail Khan district. There are here various government offices, cantonments for troops, and an important station of the Church Missionary Society. An important caravan trade is conducted with Afghanistan. It is a somewhat straggling town on a level plain. Pop. 35,131.

DERAJAT, dĕr-ą-jăt′, India, division or commissionership forming a portion of the Punjab, and occupying part of the valley of the Indus. It comprises the districts of Dera Ghazi Kahn, Dera Ismail Khan, Muzaffargarh, and Bannu. Much of it is sandy and uncultivated, but many parts are well cultivated, and irrigation is largely employed. The area under cultivation is increasing rapidly. Area, 22,315 square miles. Pop. 1,643,603.

DERBEND, or **DERBENT** («gateway»), Russia, a port and capital of the district of Daghestan, on the western shore of the Caspian, 140 miles northwest of Baku. It is charmingly situated among vineyards and orchards and fields of maize and madder, on the declivity of a branch of the Caucasus, which here approaches very close to the water's edge. It is surrounded by ancient walls. The harbor is inaccessible to all but small vessels; but a considerable trade is done at the four large markets held here yearly. Silk and cotton fabrics, earthenware and weapons are manufactured, and saffron is cultivated. It was long considered the key of Persia on the northwest side. It was captured by the Arabs in 728, by the Mongols in 1220, and frequently changed hands before it was formally incorporated with Russian Caucasia in 1813. Pop. about 15,000.

DERBIGNY, Pierre Auguste Charles Bourisgay, American statesman: b. France, about 1765; d. New Orleans, 6 Oct. 1829. During the Revolution of 1789 he was obliged to flee from France to Santo Domingo and thence to the United States, living for a while at Pittsburgh, Pa., and subsequently removing to Missouri, to Florida, finally settling in Louisiana. In 1803 he was made secretary to Mayor Borsée of New Orleans, and in the same year was appointed interpreter of languages for Governor Claiborne. In 1805 he was one of three delegates sent to petition the United States government for the admission of Louisiana as a State of the Union. Their efforts, however, were unsuccessful. Subsequently Derbigny held other public offices, such as clerk of the Court of Common Pleas, secretary of the legislative council, member of the lower house of the first State legislature and judge of the Supreme Court. He delivered the first Fourth of July oration made in Louisiana and in 1820, with Livingston and Moreau, was appointed to revise the laws of Louisiana. In that same year he received the first license issued to operate a steam ferry across the Mississippi at New Orleans. As a personal friend of General Lafayette he was his representative in legal and business affairs in Louisiana until his death. In 1828 when Governor Johnson's term of office expired, Derbigny succeeded him, and his administration was marked by the visit to New Orleans of General Jackson, who had been invited by the legislature to take part in the celebration of his victory of 8 Jan. 1815. Governor Derbigny was killed early in the second year of his administration by a fall from his carriage.

DERBY, Earl of, a title conferred in 1485 on Thomas, second Lord Stanley, two months after Bosworth Field, where he and his family had greatly contributed to Richmond's victory. The Stanleys were descended from Adam de Aldithley, who attended William the Conqueror to England, and whose grandson, having married the heiress of Thomas Stanley, of Stafford, exchanged the manor of Thalk in that county, which he had received as his wife's marriage-portion, for that of Stoneley, in the county of Derby, and afterward assumed the surname of Stanley. In 1405 Sir John Stanley, who had married the heiress of Lathom, obtained a grant of the Isle of Man, which he and his descendants ruled till 1733.

DERBY, Edward Geoffrey Smith Stanley, 14TH EARL OF, English statesman: b. Knowsley Park, Lancashire, 29 March 1799; d. there, 23 Oct. 1869. He was educated at Christ Church, Oxford, and entered Parliament shortly after leaving that university as member for Stockbridge in Hampshire. His very first speech marked him out as a skilled debater, and he rapidly rose to distinction in the House. His views at first inclined him to side with the Whig party. In 1827 he joined Canning's ministry as Under-Secretary for the colonies, and became Chief Secretary for Ireland and Lord Grey. The opposition, led by O'Connell in the House of Commons, was powerful and violent; but while he firmly resisted the extravagant demands of the opposition and the agitation for the repeal of the union, he succeeded in passing a number of measures which tended to lessen the prevailing discontent. He improved the administration of justice, carried a bill establishing a system of national education, and afterward, as Secretary of State for the colonies, supported the bill for the reform of the Irish Church, by which two archbishoprics and 10 bishoprics were abolished. He also gave his warm support to the petitions which were presented to Parliament for the abolition of slavery in the British colonies, and was successful in passing the act for this purpose in 1833. He now joined the Tories and accepted office under Sir Robert Peel, being again appointed Colonial Secretary. He distinguished himself by his wise administration of this department during the four following years. In 1851 he became Earl of Derby, succeeding his father. In 1852 and 1858 he was commanded by the queen to form a ministry but on both occasions he had to contend against a majority in the House of Commons, and was able to maintain himself in office only for a short period. He was more successful in 1866, when, on the defeat of Lord John Russell's government on one of the chief clauses of their reform bill, he undertook to form a ministry. His administration on this occasion was signalized by the reform of the government in India, the successful conduct of the Abyssinian War, and the passing of the reform bill which introduced household suffrage as the qualification for the electoral franchise. Disraeli (q.v.) was the great force in these ministries, and succeeded him in the premiership. Earl Derby joined to great ability as a statesman and brilliant oratorical powers a high degree of scholarly culture and literary ability. Among other works he published a successful translation of Homer's 'Iliad' (1864). Consult Kebbel, 'English Statesmen Since the Peace of 1815: Derby' (London 1869); Saintsbury in Reid's 'Prime Ministers of Queen Victoria' (New York 1892).

DERBY, Edward George Villiers Stanley, 17TH EARL OF: b. London, 4 April 1865, and succeeded his father the 16th Earl, in 1908. He was educated at Wellington College, served in the Grenadier Guards, 1885–95, was chief press censor in South Africa, 1900. He represented the West Houghton division of Lancashire in the Conservative interest, 1892–1906; was financial secretary to the war office, 1900–03; and Postmaster-General, 1903–05. After the outbreak of the great European War he devoted himself to securing voluntary accessions to the army and was appointed director of recruiting under what was called the Derby scheme. He was created a Knight of the Garter in 1914.

DERBY, Edward Henry Smith Stanley, 15TH EARL OF: b. Knowsley, Lancashire, 21 July 1826; d. there, 21 April 1893. He was educated at Rugby and Trinity College, Cambridge. He was a member of the House of Commons

(1848-69); Under-Secretary of Foreign Affairs; afterward Secretary of State for India. Under his superintendence the management of the British India empire was transferred from the East India Company to the government of Great Britain. In 1866 and also in 1874 he was secretary of state for foreign affairs. Lord Derby became a Liberal in 1879, and was secretary of state for the colonies under Mr. Gladstone from 1882 to 1885. However, he took a stand against Irish Home Rule in 1886 and afterward ranked among Mr. Gladstone's opponents. He became chancellor of the University of London in 1891, which post he held until his death.

DERBY, George Horatio, pen name «JOHN PHŒNIX,» American humorist: b. Dedham, Mass., 3 April 1823; d. New York, 15 May 1861. He was graduated at West Point (1846) and served in the army during the Mexican War (1846-47). He wrote a series of sketches and burlesques, entitled 'Phœnixiana' (1855); and 'The Squibob Papers' (1859).

DERBY, Orville Adelbert, American geologist: b. Kelloggsville, N. Y., 23 July 1851. He was graduated from Cornell University in 1870, made trips to Brazil in 1870 and 1871, and was instructor at Cornell in 1873-75. In 1875 he became a member of the Brazilian geological commission, and has since been engaged in geological work in Brazil, being at one time curator of the geological department of the National Museum, and holding the position of chief of the geographical and geological survey of São Paulo since 1886. In 1907 he became chief of the geological survey of Brazil. He has published a number of valuable papers on the geology and geography of Brazil, and is considered one of the first authorities on the subject. In 1891 he published the first detailed topographical maps of South America based on actual surveys.

DERBY, Conn., city in New Haven County, at the junction of the Naugatuck and Housatonic rivers and on the New York, New Haven and Hartford Railroad, nine miles west of New Haven. In 1893 the towns of Birmingham and Derby were consolidated and incorporated as the city of Derby. It is a manufacturing city of much importance and has abundant water power from the two rivers. There are extensive manufactures of brass and iron goods, typewriting machines, pianos, organs, piano players, heavy castings, engines, dairy and other machinery, files, woolen underwear, corsets, hosiery, combs, hairpins, curling irons, keys, guns and ammunition, paper, pins and spectacles, and at one time the old town had a large West India trade and noted ship-building yards. A bridge across the Naugatuck River connects Derby with the thrifty manufacturing city of Ansonia. It has several parks, daily and weekly newspapers, a national bank, good public and private schools. The government is administered by a mayor, elected biennially, and a unicameral council. It was the birthplace of Gen. David Humphreys, prominent in the Revolution. Consult Orcutt and Beardsley, 'The History of the Old Town of Derby' (Springfield 1880), and 'The Town Records of Derby, 1665-1710' (Derby 1901). Pop. (1914) 9,441.

DERBY, England, a municipal, county and parliamentary borough, capital of Derbyshire, on the Derwent River and the main line of the Midland Railway, 129 miles north-northwest of London by rail. It has some fine public buildings, among which are the churches of All Saints, Saint Alkmund and Saint Werburgh, built before the time of Henry VIII; Saint Mary's (Roman Catholic), designed by Pugin. The Derby grammar school dates from 1160. There is a very handsome free library and museum and a fine technical college. The principal manufactures are silk, cotton, paper, articles in Derbyshire spar, castings and porcelain, etc. Here are situated the offices and principal workshops of the Midland Railway, giving employment to about 12,000 workmen. The principal public utilities are municipally owned. Derby is one of the oldest towns in the kingdom, and is supposed to owe its origin to a Roman station, Derventio, situated at Little Chester, on the opposite side of the river. Under the Danes it took the name of Deoraby. Derby was the most southerly point reached by Prince Charles Edward in 1745 in his attempted march on London. Richardson, the novelist, and Herbert Spencer were natives of the town. The borough returns two members to Parliament. Pop. 109,864.

DERBY DAY, the great annual London holiday, on which «The Derby,» one of the most popular of the English horse-races, is run. It always falls on a Wednesday, being the second day of the grand race meeting, which takes place in the week after Trinity Sunday. The race is run on Epsom Downs, an extensive plain in the neighborhood of London. This race was instituted by the Earl of Derby in 1780. The entry-money is now $500, but under the new regulations introduced in 1890 the first prize is definitely fixed at $25,000 with any surplus fees. The course over which the race is run is 1 mile 4 furlongs 29 yards in length. Since the race was instituted the weights have been several times increased, until now the colts have to carry 126 pounds and the fillies 121 pounds. Derby day is now regarded, especially in London, as a great holiday, Parliament is adjourned and vast multitudes flock from the city and its neighborhood to Epsom Downs. The grand inauguration racing day of the summer season at Washington Park track, Chicago, is now called the American Derby day. See HORSE-RACING.

DERBY PORCELAIN. A porcelain factory was started in this English town in 1750 by William Duesbury assisted by Andrew Planché, a French refugee potter, and with the financial backing of a Derby banker named Heath. The venture was a success, and, in 1769, Duesbury purchased and ran the Chelsea porcelain works. In 1784 he brought the plant and workers to Derby. In 1776 he acquired the Bow porcelain factory and moved it, together with a number of artisans, to Derby. On Duesbury's death, in 1786, his son (same name) continued the works, but in 1795 he took in Michael Kean (a miniature painter) as partner, with the firm name Duesbury & Kean. Next year Duesbury died, to be succeeded by a third William Duesbury. In 1809 Robert Bloor, manager, bought the factory. Sickness caused him to engage John Thomason as manager and a Mr. Clark, sculptor and painter. The latter took over the factory on Bloor's death (1846), but made financial failure, sold out to a Staffordshire firm and the works were closed in 1848. Some of the Bloor workers were, later, employed by Sampson Hancock to carry on a small factory, using the former styles. With royal patronage the firm became The Derby Crown Porcelain Company, Ltd., in 1877, to become, in 1890, The Royal Crown Derby Porcelain Company. It continues to this day.

Characteristics.— Derby shows little of foreign art tendency in her ware. In this she stands out distinct from her contemporaries (Bow, Chelsea, Worcester). Her designs show originality and are thoroughly English. It was the time of the Adams brothers, Chippendale and Sheraton, and contemporary silversmithing and furniture are reflected. When the workers, molds and models were brought from Chelsea a number of pieces of exact similarity were made; they are the Chelsea-Derby ware that puzzles collectors.

Product.— In the earliest Derby period we know that «figures» were the chief production; Duesbury's notebook says so. We do not know of any of these existing. The later bisque (unglazed) groups and figures show extreme refinement; they are actual pieces of sculpture. Most of the Derby output consisted of tea, coffee, dinner and dessert services, delicately decorated; also flower baskets, vases, scent bottles, seals, etc. Bloor put into the market the accumulated stock of «seconds,» covering up the blemishes with «Japan taste» decoration.

Decoration.— Among the styles of this factory are «Derby Japan,» «Rock Japan,» «Grecian Japan,» «Witches Japan.» Following the Adams furniture motifs, we find vases and urns of Herculaneum model decorated with festoons of «husk» pattern (bellflower) in delicate borders, rosettes interrupting. The noted Derby «gros-bleu,» claret and canary made lovely backgrounds. Some transfer-printing was done, but Duesbury preferred the more expensive but artistic handpainting. Beautiful flower decoration appears from talented artists (Billingsley's unrivaled roses). Last period shows profuse gilding.

Glaze.— «Soft, lustrous, satiny» are the terms used by connoisseurs. Derby glaze was so soft it powders under a file; services used show wear on the surface. So soft is this glaze that the enamel colors of the decoration appear to have sunk into it almost like underglaze pigments. Bloor's glaze was harder.

Paste.— Of course early paste is likely to have been the same as Chelsea and Bow, glassy. Soapstone and bone-ash were added in the true Derby paste, later china clay. From 1770 we have a true *pâte tendre* with close fracture and strongly translucent. Bloor paste is inferior.

Marks.— From 1769 to 1773 an anchor surrounded by the Derby «D.» In 1773 a crown with jewelled bows is added to the «D» (in blue, purple or puce). A crown surrounded by «Duesbury Derby» in gold appears. The crown was authorized by King George II and remained thereafter. Duesbury the Second period (1786–94) used crown and «cross batons» additional to last mark. Duesbury-Kean period used DK monogram. Duesbury III used «W. Duesbury 1803» surmounting a crown, cross batons below and D bottom of all. This was the last mark. We find the crown in puce, blue, purple, green, lilac, rose, vermilion, black and (rarely) gold.

Artists.— Duesbury gathered in perhaps the finest artists of any English ceramic factory. There were R. Askew, flower painter; William Billingsley, the noted flower genius; Zachariah Bowman, landscapes and birds; John Haslem, flowers (later portrait painter to the queen); F. Duvivier, flowers; Michael Kean, miniatures; W. Pegg, plants and single flowers; J. Bacon, R.A., modeler; W. Coffee, modeler; Hill, landscapes; Brewer, figures and landscapes; Keys, gilder; and many equally as noted.

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Clement W. Coumbe.

DERBYSHIRE, a north midland county in England; area, 1,029 square miles. The county is noted more for its coal mining and manufacturing than for agriculture although about 70 per cent of the area is productively occupied. Oats, barley, potatoes and wheat are the principal crops, with dairy farming and pasture in the uplands. Its beautiful scenery and the numerous mineral springs attract tourists and health seekers. The Peak district is one of the most attractive in the kingdom — Kinder Peak rising to 2,088 feet and the Peak to 1,880 feet. The Trent and the Derwent are the principal rivers. Its chief minerals are coal, iron ore, lead, flour or Derbyshire spar, limestones, marble, zinc and elastic bitumen. Some of the industries of the county are malting and brewing, the manufacture of iron, silk and cotton goods, calico prints, agricultural implements, paper, hats, porcelain, various kinds of cloth, and vases, urns, etc., from the Derbyshire spar. Coal mining is an important industry and to transport the coal several canals and railroads cross the county. The principal towns are Derby, Buxton and Belper. Haddon Hall, the original of Martindale Hall in Scott's ‘Peveril of the Peak,’ and Chatsworth, the seat of the Devonshire, are noteworthy historically and as architectural types. For parliamentary purposes the county is divided into seven constituencies, each returning one member. Pop. 683,423.

DERBYSHIRE SPAR, the finely crystallized fluorite from Derbyshire. The «Blue John» of the Derbyshire miners is a crystalline fluorite in which are alternate bands of blue and pale yellow spar. It is made into ornamental articles such as vases. See Fluorite.

DERCETO, dĕr-sē'tō, the Greek name of Atargates, a Syrian goddess, the principal female deity of the Philistines, widely worshipped at Ascalon. She was the female counterpart of Dagon (q.v.), terminating like him in a fish. She was a nature goddess presiding over the principle of generation and fertility, corresponding to the later Greek goddess Aphrodite and the Roman Venus.

DERECSKE, dĕ'rĕch-kĕ, Austria-Hungary, a market town in Hungary, in the county of Bihar. In the neighborhood are four lakes, from which, by evaporation, soda is obtained. Nearby is another lake, called Fingoto, celebrated from the earliest times for its baths. In the same locality pearls are found, which, though small, are equal in beauty to those of the East. Pop. 8,272.

DERELICT, any property abandoned, deserted or cast away in such a manner as to indicate by the owner that he has relinquished claim thereunto. The mere intention of abandonment does not constitute dereliction. A ship abandoned at sea either by consent or compulsion under stress of weather or other unforeseen conditions is not forfeited if any evidence is left thereon of the owner's intention to return when the stress is removed. The owner may recover on payment of salvage within a year and a day, otherwise the property is considered derelict. The same rule applies to goods thrown overboard.

DERENBOURG, dẹ-räñ'boor', **Hartwig**, French Orientalist: b. Paris, 17 June 1844; d. 1908. He studied at Göttingen and Leipzig, pursuing Arabic later at the Paris École des Hautes Études. Engaged at the Bibliothèque Impériale to continue the preparation of the catalogue of Arabic manuscripts in 1879 he was appointed professor of Arabic and in 1886 professor of Islamism and the religions of Arabia at the École des Hautes Études. In 1880 he examined the Arabic manuscripts in the Escurial and other libraries in Spain (Vol. 1 of his Escurial catalogue appearing in 1884), and on his return was made assistant to the commission upon Semitic inscriptions at the Academie des Inscriptions et Belles-Lettres. He issued a number of valuable editions of Arabic writers and became a member of the Institute in 1900.

DERENBOURG, Joseph, French Orientalist: b. Mayence, 21 Aug. 1811; d. Bad-Ems, 29 Aug. 1895. Of a family distinguished for learning, whose original home was Derenburg in Saxony, after rabbinical studies in his early youth, he went first to Giessen and then to Bonn, where Freytag was his Arabic teacher, and from which he gained his doctorate in 1834. A few years were spent as private tutor in Amsterdam, when in 1838 he settled in Paris. In 1852 he became proofreader of Oriental texts at the Imprimerie Impériale, which position he resigned in 1879, owing to an affection of the eye. He was an active educational factor in French Judaism, and with wider fields of Oriental learning made noteworthy contributions, his erudite works proving mines of value for later scholars. For example, his 'Essai sur l'histoire et la géographie de la Palestine' (Paris 1867) shed much light on the history of the Jews in the time of Christ. He planned a complete edition of Saadia's works in Arabic and French, a large part appearing in his lifetime. He issued a second edition of S. de Sacy's 'Séances de Hariri,' and collaborated with his son Hartwig in his edition of Abu-la Walid, and of Saadia.

DE RERUM NATURA, dẹ rā-rụm nā-too'rā ('On the Nature of Things'), a philosophical poem of about 7,500 hexameter verses, conceived and written in the grand style that is part of the epic form, and dealing with the physical constitution and environment of human life with a view to the emancipation of that life from the tyranny of superstition and of mean desire. The doctrines set forth are those of Epicurus, whom the author reveres as the savior of mankind. Of this author, Titus Lucretius Carus, we know practically nothing except through the revelation of his personality that is made in the poem itself. Saint Jerome, it is true, in his continuation of the Chronicle of Eusebius, says that Lucretius was born in 95 B.C., became insane through the effects of a love-potion, wrote in his lucid intervals «several books» which Cicero subsequently edited, and died by his own hand in his forty-fourth year. Every clause of this brief statement has been disputed and there is no general agreement as to the amount of truth that may be contained in it. It would seem, on the one hand, highly improbable that a poem should have been thus composed that exhibits on almost every page extraordinary acuteness of observation and reasoning. On the other hand, the passionate intensity which marks the style from beginning to end has suggested to many readers, as it did to DeQuincey, that the author was laboring under some abnormal strain, and the internal evidence is conclusive that the work did not receive final revision. But interesting as it would be to know something of the details of the poet's life, it is not likely that any such knowledge would materially change the idea that we have been able to form of him from his work. No poet was ever less autobiographical; no poet ever made a more complete revelation of his essential self. The greater part of the poem is concerned with the proof of the existence and character of the laws of the physical universe. Yet Lucretius is interested in physical science primarily because it alone provides the necessary foundation for his doctrine of ethics. Observing everywhere in the history of the Mediterranean world the sufferings of mankind due to belief in the power of anthropomorphic and capricious deities, he set himself the task that modern science has in fact accomplished, to prove that the reign of law is universal, that given causes produce given effects, and that no arbitrary interposition of an external power can modify in the slightest degree the chain of causation. It follows that man is master of his fate, that neither in this world nor in the next (for, the soul being atomic, there is no next) can the gods affect his life in any way for weal or for woe, and that therefore, if only he is willing to achieve knowledge of nature and control of himself, he may order his thought and action according to the dictates of reason and thus live a life «that is worthy of the gods.» For though they have no power, the gods do exist. Somewhere in the interstellar spaces is their seat and there in «passionless tranquillity» they incarnate Epicurean perfection. No aspect of the poem is more striking or more engaging than the enthusiasm with which Lucretius dwells upon this conception of universal law and supports it by a literally amazing variety of evidence. Everywhere in the poem there is evidence of a life passed in the open air. He draws instances in support of his reasoning from phenomena within the range of everyone's observation, from the sky, from the sea, from forest and stream, from the life of animals and of men. Yet he is equally at home in the stretches of infinite space and infinite time and reasons with no less absolute confidence about the world of the infinitesimally small, where the atoms that must forever elude the observation of the senses are laying the foundations of the visible universe. The poem shows, in fact, that he had to an extent that is surprising in a disciple of Epicurus a passion for knowledge for its own sake. But his supreme interest was, after all, in the nobility of feeling, thought and action that this rational understanding of nature's processes brings at last within the reach of men. Intellectually an aristocrat, he is yet essentially a social reformer, and is moved to the depths of his being by the pathos of human life. And the ever-present tragedy is especially poignant because it is quite unnecessary. The way of salvation is simple and obvious; yet it is extremely difficult to persuade men to follow it. Happiness, for which all mankind strives, continues to be sought by means that all experience proves will still, as heretofore, fail to secure it. Simplicity of living, riches gained not by increase of possessions but by diminution of desires, contentment found in fundamental human relationships, a life, in brief, devoid of ambition and largely contemplative, such an ordering of existence even in a world whose laws are, on the whole, austere, will gain for man real happiness, and, at the worst, such happiness as is possible under the circumstances. For a mature mind cannot be content with fairy-tales. The facts of life and equally the fact of death must be faced uncompromisingly if man is to retain his self-respect. Rational beings will seek therefore a possible, not an impossible, happiness. Lucretius preaches this gospel of quietism with the fervor of an evangelist and the imaginative power of a great poet.

The poem has been finely translated into prose by H. A. J. Munro (4th ed., Cambridge 1886) and by C. Bailey (Oxford 1910); into verse by W. E. Leonard (New York 1916). Illuminating criticism may be found in the following works: Sellar, W. Y., 'Roman Poets of the Republic' (3d ed., Oxford 1889); Mackail, J. W., 'Latin Literature' (New York 1895); Duff, J. W., 'Literary History of Rome' (2d ed., London 1910); Santayana, G., 'Three Philosophical Poets' (Harvard University 1910); Woodberry, G. E., 'Inspiration of Poetry' (New York 1910); Thomson, J. A. K., 'Greek Tradition' (New York 1915); Masson, J., 'Lucretius, Epicurean and Poet' (2 vols., New York 1907, 1909). Consult also Mallock, W. H., 'Lucretius on Life and Death' (New York 1900) and Tennyson's poem 'Lucretius.' W. A. Merrill has edited the Latin text with an introduction and full commentary on all six books (New York 1907)

Nelson G. McCrea.

DE RESZKE. See Reszke.

DERG, Lough, lŏH dĕrg. (1) An expansion of the Shannon River, between the provinces of Munster and Connaught, Ireland. It is 24 miles long and from two to six miles broad. (2) A lake in the southeast of the county of Donegal, province of Ulster, Ireland. It is three miles long and two and one-half miles wide. Saint's Isle and Station Island are in this lake.

DERMATITIS, a name given to certain inflammations of the skin, characterized not so much according to form and arrangement of the pathological changes taking place in the skin, but rather from their cause. These causes may act from within or without. The characteristic change taking place is some form of erythema or redness, with the characteristic heat, redness and swelling. Thus there are found dermatitis traumatica, or the dermatitis set up by mechanical injuries such as blows, pressure, friction, scratching; dermatitis calorica, such as is due to sunburn or frostbite; X-ray dermatitis, dermatitis venenata, due to animal, vegetable or mineral poisons, such as mustard, turpentine, croton-oil, tartar emetic, poison ivy, nettle, aniline dyes, strong acids, strong alkalis, arnica, etc.; dermatitis medicamentosa or drug eruptions, such as happen following the use of antifebrin, antipyrin, belladonna, arsenic, bromides, iodides, etc. There may be also dermatitis following vaccination or following poisoning in wounds. There are other forms too numerous to mention, but those given are the commonest.

DERMATOLOGY (from Gr. *derma*, the skin), a science that treats of skin diseases. See Skin.

DERMATOPHYTE, a parasitic plant, a sort of fungus infesting the cuticle and epidermis of men and animals, and giving rise to various forms of skin diseases. The commonly known species are *Achorion schœnleinii* (favus); *Trichophyton tonsurans* (ringworm), and *Microsporon furfur* (dandruff, scurf).

DERMESTES, dèr-mĕs'tēz, a genus of coleopterous insects, the type of the family *Dermestidæ*. The larvæ of this genus are covered with slippery hairs. They devour dead bodies, skins, leather and other animal substances. One species (*D. lardarius*) is known by the name of bacon-beetle, and is often found in ill-kept ham or pork chops. Many insects, the larvæ of which have similar habits to those of the true *Dermestes*, sometimes receive that name, although they really belong to the genera *Attagenus*, *Necrophorus*, etc.

DERMOT MAC MURRAGH, Irish king: the last ruler of Leinster before the sovereignty was assumed by Strongbow in the reign of Henry II of England. He became king of Leinster in 1140, and having carried off the wife of O'Ruarc, Prince of Leitrim, was attacked by the latter and was driven from Ireland in 1167. He betook himself to Aquitaine, where he did homage to the English king, who granted him permission to enlist adventurers in England to aid him in recovering his kingdom. He received the aid of Richard de Clare, Earl of Pembroke, usually called Strongbow, who married his daughter Eva in 1170. With his aid he proved victorious, but when he died in the same year his kingdom was assumed by his son-in-law.

DERNBURG, dĕrn'boorH, **Bernhard,** German statesman: b. Hesse-Darmstadt 1856. Of Jewish extraction, he received a commercial education and as a young man came to America and engaged in banking business, acquiring a good knowledge of American methods and the English language. In 1906 he was appointed Colonial Secretary, and during his four years' tenure of the office he succeeded in developing the resources of the German colonies, notably Southwest Africa. His hustling business methods and brusque manners brought him into frequent conflict with other officials, and he was obliged to resign. A wealthy man, he occupied himself mainly with economic studies till the European War broke out, when he was sent to the United States to co-operate with Count Bernstorff to win American friendship. The press campaign he conducted in New York was directed toward justifying German policy and placing England with Belgium in the wrong. He published Germany's peace conditions in April 1915, declaring there was nothing in the German program «which would not be beneficial to the rest of the world, especially the United States.»

DERNE, dĕrn, or **DERNA,** Africa, town of Tripoli, in Barca, on the north coast of Africa, in a fertile district. It was captured by the United States fleet in 1805 during the war against Tripoli. Pop. about 7,000. See DERNE EXPEDITION.

DERNE EXPEDITION (Derna or Dern), a military expedition undertaken during 1805 by William Eaton (q.v.), United States consul to Tunis in 1799–1803, to secure recognition of American international rights. Eaton became indignant at the abject submission of Christendom, part from fear and part from greed, to the wretched Barbary pirates; he had raged at their insults year after year while he was consul at Tunis; and when Tripoli, in 1801, finally insisted on war despite all payments, eagerly seized the chance of ending its robberies once for all by making it a United States protectorate. About 1792 Hamet Caramanli or Caramelli, pasha of Tripoli, had been deposed by his brother Yusuf and fled to Tunis, where he was then living; and Eaton resolved to have the United States restore him on condition of peace and no tribute, and thus strike terror into the other piratical states. He borrowed $22,000 for Hamet to equip a force with which our navy was to co-operate; but the naval commanders' hands were tied by their instructions, and in 1803 Eaton's plain-spoken refusal to comply with the bey's extortions caused his peremptory dismissal as consul. He returned to the United States and urged Jefferson to make the country a United States' protectorate, but the government did not feel justified in giving *carte blanche* for so daring a scheme. At length, in March 1804, Eaton was sent to the Mediterranean as «naval agent» with Barron's squadron, but without authority or instructions. He cared for neither squadron nor authority if he could have help and be left to act untrammeled. Meantime Hamet Caramanli had failed and fled to Egypt, where, when Eaton arrived at Cairo on 8 December (having heard at Malta, in September, of Hamet's fiasco), the viceroy was besieging him and a few followers at Minyeh on the Nile. Eaton rescued him at great pains and some peril, and brought him to Alexandria; made a pact with him and a plan of campaign with Barron, and collected an «army» of some 500 floaters — the majority Arabs, some Tripolitan Kabyles, a hundred Alexandrian Christian Greeks and Americans, a most extraordinary rabble for a desperate military venture — and started for a march of 600 miles across the Libyan Desert to Derne, the seaport capital of Barca, the most fertile province of Tripoli. They had no provisions but what they carried and no water for days together, and more than once the Arabs with Hamet were on the point of deserting in a body or cutting Eaton's throat. His energy and moral force finally pulled the entire body through a six weeks' march to Bomba, just east of Derne, 17 April 1805; but no ships were in sight. The Arabs cursed him afresh as an infidel traitor and resolved to break up next morning; Eaton and the Christians took post on a hill for the night and lit fires, and next morning the waiting fleet saw the smoke and came in. The Arabs rejoined them and after restocking from the fleet and resting a week, on the 25th, in co-operation with three cruisers, they assailed Derne, defended by earthworks and 800 men. On the 27th they carried it by storm, Eaton being shot through the wrist. A large force was sent from Tripoli to retake it and on 13 May he repulsed it in a sharp engagement with the aid of the fleet's guns. Another month passed; Derne showed no enthusiasm over Hamet, one Oriental master being about the same as another; Eaton could not march on Tripoli, some 700 miles farther on, but the pasha's troops could not drive him from Derne. Suddenly the ground was cut from under his feet by the treaty arranged with the pasha by Tobias Lear, United States consul-general for Algiers and commissioner of peace, it is said through jealousy of Eaton's success. Hamet's supporters were left to the pasha's vengeance, Hamet to European exile and a grudging pension, and Hamet's family became possessions of the pasha. (See BARBARY POWERS, UNITED STATES TREATIES AND WARS WITH THE). Eaton returned to America, and his services, while slighted or ignored by government officials, were recognized «as the virtues and undaunted courage of a single man,» in a resolution passed by a large majority in the senate of Massachusetts, 25 Feb. 1806, the committee for the sale of Eastern lands being «authorized and directed to convey to William Eaton, Esq., a citizen of this Commonwealth and to his heirs and assigns, a tract of land, to contain 10,000 acres of any of the unappropriated land of this Commonwealth in the District of Maine, excepting the ten townships on Penobscot River.» His exploit was also perpetuated in verse by Paine, author of ‹Home, Sweet Home,› and by John Pierpont. In 1808 General Eaton was the principal agent in foiling the Aaron Burr conspiracy to invade Mexico. Consult ‹Life of the late Gen. William Eaton› (Brookfield 1813).

DEROSNE, dĕ-rōn, **Charles,** French chemist and inventor: b. Paris 1780; d. there September 1846. He devised a still for the rectification of alcohol so arranged that instead of the weaker aqueous spirit which distilled being completely condensed by cold water, it was condensed by water only a little under the boiling point of the mixture, so that while the alcohol still remained as vapor, a large proportion of the watery vapor was condensed, and thus the distillate was made stronger. This apparatus is called by his name. His most important research was into the composition of opium, in the course of which he isolated a crystalline body, long distinguished as Derosne's salt. He himself did not determine its character, and it was not till some years later that it was distinguished as an alkaloid by Robiquet, and called by him narcotin, the name by which it is now known. He was the first to introduce animal charcoal for decolorizing syrup.

DE ROSNY, rō'nē, **Léon Louis Lucien Prunol,** French Orientalist: b. Loos, France, 5 Aug. 1837. He studied in Paris at the École des Langues Orientales, became professor of Japanese at the Special School of Languages in 1868 and founder of the International Congress of Orientalists. In 1863 he was interpreter to the Japanese ambassadors at Paris, whom he accompanied to Holland, England and Russia. He was decorated with the Legion of Honor in 1884 and in 1886 was nominated assistant director of the École des Hautes-Etudes. Among his numerous works are 'Asiatic Studies' (1864); 'The Origin of Language' (1869); 'Japanese Anthology' (1871); 'A Grammar of the Chinese Language' (London 1874); 'Japanese Religion' (1881); 'Vocabulaire de l'écriture hiératique yucatèque' (1883; 2d ed., 1886); 'Le livre sacré et canonique de l'antiquité Japonaise' (1885); 'Les populations danubiennes' (1882–85); 'Le Taoïsme (1892); 'Cours pratique de la langue Japonaise' (1903); 'L'Amérique précolombienne' (1904); 'La Bible du Japon' (1904), and various translations, pamphlets and essays.

DE ROSSET, Armand John, American physician: b. Wilmington, N. C., 17 Nov. 1767; d. there, 1 April 1859. He was the son of Moses John De Rosset of London and Mary Ivie, a native of the West Indies. In 1784 he was matriculated at Princeton. At the close of the first session of his collegiate course a fellow-student, Robert G. Harper, observing his rigid economy and close attention to duties and his determination to remain at the college during vacation for want of funds to defray the expenses of the journey home, offered to be his teacher in the studies of the next year. The offer was gladly accepted and at the opening of the next session De Rosset was promoted to an advanced class, completing his course in three years. While at the medical college he enjoyed the friendship of Dr. Rush, with whom he had a long correspondence. He was appointed by the President of the United States to be post-physician, which office he held for many years. During two or more terms he served in the town government. His writings were confined to contributions to medical publications — a pamphlet 'De febribus intermittentibus,' a Latin thesis, etc. His son, MOSES JOHN: b. Wilmington, N. C., 11 Jan. 1796; d. there, 30 June 1826, also entered the medical profession, in which he was associated with his father from 1818 until his death. ARMAND JOHN, another son of Armand John De Rosset, was born in Wilmington, 6 Oct. 1807; d. 1897. He attended the medical college of Charleston, S. C., in 1826–27, and was graduated at the medical department of the University of Pennsylvania in 1827. From 1828 to 1837 he practised his profession in Wilmington and then engaged in mercantile affairs, which he relinquished only a few years previous to his demise at the advanced age of 90 years.

DE ROSSET, Moses John, American physician, son of Armand John De Rosset (1807–97): b. Pittsboro, N. C., 4 July 1838; d. Wilmington, N. C., 1 May 1881. In youth he showed remarkable aptitude for languages and mathematics. He spent three years in Geneva at the famous school of Diederich and spent six months in Cologne to perfect himself in German. He was graduated in the medical department of the University of New York in 1859 and was appointed resident physician at Bellevue Hospital, New York, in the same year. At the beginning of the Civil War he entered the Confederate army as assistant surgeon and, after serving through Stonewall Jackson's Valley campaign, was promoted to full surgeon and assigned to duty in Richmond. Subsequently he was detached as inspector of hospitals of the department of Henrico. At the close of the war he settled in Baltimore, where he was appointed adjunct professor of chemistry in the medical department of the University of Maryland. He was also professor of chemistry in the dental college of that city. He here prepared himself for practice in diseases of the ear and eye, and in 1873 removed to Wilmington, N. C., and devoted himself to this specialty, becoming also a contributor to the *North Carolina Medical Journal.* To improve his health he removed for a time to Texas but soon returned to Baltimore, where he issued a translation of Bouchardat's 'Annual Abstract of Therapeutics, Materia Medica, Pharmacy and Toxicology for 1867.' His writings were chiefly contributions to medical journals.

DEROULEDE, dā-roo-lād', **Paul,** French poet: b. Paris, 2 Sept. 1846; d. 1914. His 'Soldier Songs' (1872) and 'Military Refrains' (1888) were immensely popular, and won him the presidency of the Patriotic League, an association intensely hostile to Germans, and whose agitation seemed likely to lead to a collision with Germany, wherefore the poet was prevailed on to retire from the presidency. He was the chief advocate of the «revanche» against Germany, having taken part as a soldier in the disastrous campaign of 1870–71. In 1883 he went to Russia to further the cause of a Franco-Russian alliance; and supported General Boulanger during his temporary rise to power. His anti-Semitism was marked during the Dreyfus case. He was a member of the Chamber of Deputies 1893–95 and 1898–99. He was condemned to banishment in 1900 for 10 years for conspiracy against the republic. The amnesty of 1905 reduced this to five years, and in 1906 he sought but unsuccessfully re-election to the Chamber of Deputies. He wrote a drama on patriotism, 'The Hetman,' and the semi-religious drama, 'The Moabitess.' Other works are a patriotic cantata, 'Vive la France' (1880); 'Messire du Guesclin' (1895); 'La Mort de Hoche' (1897); 'Poésies militaires' (1896); etc.

DERR, Louis, American physicist: b. Pottsville, Pa., 6 Aug. 1868. In 1889 he was graduated at Amherst College and studied also at the

Massachusetts Institute of Technology 1892, and at the Harvard Graduate School 1892–93. In 1892 he became assistant in physics at the Massachusetts Institute of Technology and became full professor in 1909. He was also instructor in physics at Boston University 1893–98, and from 1895 to 1908 was in charge of instruction in physics at the Boston Normal School of Gymnastics. He is Fellow of the American Academy of Arts and Sciences and member of the American Physical Society. He has published 'Notes on the Principles of Dynamo and Transformer Design' (1902); 'Photography for Students of Physics and Chemistry' (1906). He edited the 'Cyclopedia of Engineering' (1902; 2d ed., 1912) and since 1907 is assistant editor of *Chemical Abstracts*. He has also published numerous papers in scientific journals.

DERRICK, a mechanical device for lifting and shifting heavy weights. The simplest form of derrick is the gin, a tripod of three legs, with a compound pulley at the apex and another at the hoisting hook and a windlass to operate the pulley rope. These simple derricks are easily portable and are used very commonly for lifting stones, pulling stumps, lowering iron pipes into trenches and similar work. The builders' derrick has two legs framed together like a broad ladder and set wider apart at the bottom than at the top. The foot piece at the bottom is fitted with wheels which run sideways along a plank parallel to the face of the building. The top of the derrick is inclined toward the building and is held in position by guy ropes. This form of derrick is used by stone masons to lift and set in place stone facing, sills, lintels, columns, etc. It is sometimes footed on a beam of an upper story, hanging outward over the street and used also to hoist lumber, window frames and the like.

For large and heavy work, as in excavations and the erections of steel-frame buildings, the derrick in common use is the guy derrick, comprising a mast held upright by four to seven guys widely extended and securely anchored and a boom attached to the mast near the bottom by a hinged joint, so that it may rise and fall in a vertical plane; the whole having the outline of the letter *V*. The foot of the mast is a pivot pin set in an opening in a heavy base plate, or, in very large derricks, a ball and socket joint. The guys at the top are attached to a thick circular plate which slips down on a gudgeon pin. The mast is thus free to revolve and if the derrick is small, it is swung by means of a horizontal pushing bar; if large, the base of the mast is fitted with a bull wheel, from five to eight feet in diameter, which is operated by cable from a winding engine. Derricks are usually equipped with two separate hoists, one lifting the load and the other drawing in the guy ropes which control the sag of the boom away from the mast. The winding drums which do this work are generally detached from the derrick itself, but in some cases the winding machinery is built on a platform attached to the base of the mast and revolves with it upon a cogged circular track. In confined situations, as between buildings in cities, where there lacks room to stretch guys to support the mast, the stiff-leg derrick is used. In this type the mast is held at the top by two heavy beams or legs which spread apart at the ground to the ends of an arc of 90 degrees. The bases of these legs are heavily anchored with stone, bags of sand and gravel or other weighty material.

Small derricks are of wood; the masts being from 20 to 45 feet in height, and respectively from 10 to 22 inches square, and with booms relatively from 8 to 16 inches square. A five-ton derrick will have a mast 25 feet long, and a boom of 30 feet. The guys will be wire cables of one inch diameter, and the hoisting cable from five-eighths to three-quarters inch in diameter. If the derrick is upheld with stiff legs, they will have the same cross section as the mast, and be as long as the working area will permit. In stiff-leg derricks the mast is usually much shorter than the boom. The masts and booms of timber derricks are sometimes trussed with iron rods to strengthen them, but for extra heavy work the derrick is often all metal, of latticed structural steel. (See Crane). Consult Adams, H., 'The Mechanics of Building Construction' (New York 1912); Hess, H. D., 'Machine Design; Hoists, Derricks, Cranes' (Philadelphia 1912); Thomson, T. K., 'Hoisting Machines for the Handling of Materials' (New York 1908).

DE RUSSY, René Edward, American military officer: b. Haiti, W. I., 22 Feb. 1789; d. San Francisco, 23 Nov. 1865. He graduated at the United States Military Academy in 1812, serving with credit in the war with England. He subsequently supervised the construction of fortifications in New York harbor and the Gulf of Mexico. During the Civil War he was ordered to the Pacific Coast, where he constructed defenses in San Francisco harbor.

DERVISH, the Persian word for the Arabic faqir or fakir. See Fakir.

DERWENT, dĕr'wĕnt, (1) the name of four rivers in England, in Derbyshire, Yorkshire, Durham and Cumberland, respectively. The Yorkshire Derwent is a tributary of the Ouse. (2) A river in Tasmania. It rises in Lake Saint Clare in the centre of the island and enters Storm Bay by an estuary. A lighthouse, elevated 70 feet above the sea, has been erected on Iron Pot Island, at the entrance of the Derwent, exhibiting a fixed light, visible at from 12 to 15 miles' distance. On the Derwent estuary is the town of Hobart. Its entire length is about 130 miles and it is navigable as far as Hobart.

DERWENTWATER, James Ratcliffe, Earl of, English nobleman: b. London, 28 June 1689; d. London, 24 Feb. 1716. His grandfather had been created Earl of Derwentwater by James II, and his father, Francis, married a natural daughter of Charles II. He succeeded to the title in 1705 and entertained a personal attachment toward the Stuart family, which induced him to take part in the attempt to restore them to the English throne. The standard of revolt having been raised in Scotland, Lord Derwentwater commenced the movement in England on 6 Oct. 1715. The cause of the Pretender was a losing one from the first, and in spite of the energy and courage displayed by the Earl of Derwentwater and other Jacobite nobles, they were compelled to surrender at discretion at Preston on 13 Nov. 1715. The Earl of Derwentwater, being impeached for high treason, pleaded guilty, and was beheaded on Tower Hill. His estates were confiscated and given to Greenwich Hospital.

DERWENTWATER, or KESWICK LAKE, a beautiful lake in Cumberland, England, in the vale of Keswick. It is about three miles in length and one and a half in breadth, and stretches from Skiddaw on the north to the hills of Borrowdale. Near the northeast corner is the celebrated cascade of Lodore. Its waters are carried to the sea by the Derwent.

DERZHAVIN, dyĕr-zhä'vĕn, **Gabriel Romanovitch,** Russian lyric poet: b. Kazan, 14 July 1743; d. Novgorod, 6 July 1816. He joined the Preobrazhensky Guard in 1782, becoming lieutenant-captain in 1783. He became successively governor of Olonetz (1784) and of Tambov (1785). In 1793 he was called to the Senate, in 1800 was master of the Imperial treasury, and in 1802 was Minister of Justice. The year following he was permitted to retire on full pay. His poetic talent had become early developed, and he is generally allowed to hold the first place among the poets who appeared during the reign of Catharine. He was an enthusiastic admirer of this empress, and has celebrated her in his most brilliant odes. Of these, at once the most beautiful and the best known is his ‹Oda Bog,› or ‹Ode to God,› which, for sublimity both of thought and expression, has seldom been surpassed, and has been translated into most European languages. Almost all his poems are rich in true poetic beauties, though occasionally he indulges too much in gaudy Oriental metaphor. His works, containing, in addition to the Odes, several dramatic pieces and prose writings, were published at Saint Petersburg (9 vols., 1864–83), the eighth volume of which is a biography of the author by the editor, J. Grot. See ODE TO GOD.

DESAGUADERO, dä-sä-gwä-dä'rō, a valley in Bolivia and Peru, between two ridges of the Andes into which the great chain divides, near the city of Potosí. This valley or tableland is about 400 miles in length, and varies from 30 to 80 miles in breadth; area 150,000 square miles, and includes Lake Titicaca, and the smaller lake Aullagas or Uros. Desaguadero signifies in Spanish «a channel.»

DESAGUADERO RIVER, Bolivia, the outlet for the waters of Lake Titicaca. It is 180 miles in length, running from Lake Titicaca southward to Lake Poopó or Agullas, in the department of Oruro. The lake last mentioned is without any known outlet. For many years traffic on this river has been hampered, the Lake Titicaca steamers running only as far as the town of Desaguadero (the head of navigation, pending improvements, for boats of considerable size), while beyond that town smaller steamers, engaged in carrying the silver and tin ores of Oruro and the copper of Corocoro, descended to a point 40 miles farther down the stream. A concession for canalizing the Desaguadero so as to extend navigation about 200 miles farther south was granted by the Bolivian government to a Peruvian corporation in 1892. Moreover a railroad has been built from the northern shore of Lake Titicaca to Cuzco. These works form a system of land and water transportation unique in all the world; approximately 500 miles in length, and at an altitude ranging between 11,000 and 13,000 feet above the level of the sea, connecting the historic Cuzco (the ancient Inca capital) and the extensive silver and lead districts of Totalaya on the north, with the mines of Corocoro and Oruro.

DESAIX DE VEYGOUX, dė-sā' dė vā-goo, **Louis Charles Antoine,** French general: b. Saint Hilaire-d'Ayat, Auvergne, 17 Aug. 1768; d. Marengo, 14 June 1800. Entering the army at 15, he was in 1792 appointed aide to Prince Victor de Broglie, commander of the Army of the Rhine. He was promoted to the command of a brigade in 1793–94, and then of a division. In 1796 he covered himself with glory by his heroic conduct in Moreau's famous retreat through the Black Forest. Behind the ruinous fortress of Kehl, Desaix resisted the Austrian army for more than two months, only capitulating in January 1797, when his ammunition was spent. He served with Bonaparte in Egypt, where he distinguished himself greatly, and was appointed governor of the upper part of the country. He completely subdued Upper Egypt, and received, as a testimony of admiration from Bonaparte, a sword, with this inscription on its blade, «Conquête de la Haute Égypte.» His own soldiers used to compare him to Bayard, while the inhabitants named him «the Just Sultan.» He was obliged, however, in 1800, to sign the unfavorable treaty of El Arish with the Turks and English, and on his way to France was captured and detained by Lord Keith as a prisoner of war. He afterward obtained his parole, and returned from Egypt just in time to take part in the battle of Marengo, in which he was killed. A statue has been erected to his memory at Paris. Consult Bonval, E., ‹Histoire de Desaix› (Paris 1881).

DESATIR, the name given to a collection of sacred books, purporting to be the work of the 15 old Persian prophets, together with a book of Zoroaster. The collection is written in a language no longer spoken and equally different from the Zend, the Pehlvi and modern Persian. The last of the 15 prophets, Sasan, who lived at the time of the downfall of the Sassanides, literally translated the Desâtir, and accompanied it with commentaries. This work was until the 17th century one of the chief sources of the ancient Persian religious doctrines, interwoven with astrology and demonology; and, after having been forgotten for about a century and a half, was discovered at Ispahan and published at Bombay in 1818. Erskine added an English translation, but considered the collection as spurious; and Sylvester de Sacy believed it the work of a Parsee in the 4th century of the Hegira, who invented the language. By some, however, it is considered as genuine. No trace of any connection with the Zendavesta and the magic of the Parsees has been found in the Desâtir.

DÉSAUGIERS, dā-zō'zhā, **Marc Antoine Madeleine,** French song writer and dramatist: b. Fréjus, 17 Nov. 1772; d. Paris, 9 Aug. 1827. He was educated for the ministry at the College Mazarin, Paris. While visiting San Domingo he became a prisoner of the revolted blacks. His life was in great danger, but he managed to escape to the United States where he taught pianoforte playing at Philadelphia. He returned to Paris in 1805 and began his dramatic career. His parody of the opera ‹Danaids› («The Little Danaids») was acted for 300 consecutive nights. His vaudevilles were remarkably successful. As a light song writer he is second only, if indeed second, to Beranger. Many of his songs will live long; such as 'The Consolations of Old Age,' 'The Picture of New Year's,' 'The Market,' 'Sunday Pleasures,' 'The Palais Royal.'

DESAULT, dė'-sō', **Pierre Joseph,** French surgeon: b. Magny-Vernais, 6 Feb. 1744; d. Paris, 1 June 1795. He was led by his inclination to the surgical profession; in consequence of which he entered the military hospital at Béfort, where his situation was favorable for obtaining a knowledge of the treatment of wounds from fire-arms, in which department he afterward rose to great eminence. He went to Paris in 1764, and was one of the numerous scholars of the celebrated Petit. After having been several years principal surgeon of the hospital De la Charité, he was put at the head of the great Hôtel-Dieu in Paris, in 1788. Here he founded a surgical school, in which have been educated many of the most eminent surgeons of Europe. His principal merits were that he brought accuracy and method into the study of surgery; improved the treatment of fractured bones by adopting improved bandages; and first introduced into France the clinical method of instruction in surgery. He was distinguished for the skill and boldness with which he performed operations. Desault wrote only two small treatises; but the *Journal de Chirurgie,* in which his scholars published his lectures delivered in the Hôtel-Dieu, and the 'Œuvres Chirurgicales' (3 vols., 1798–1803, Eng. trans., 1814), edited by Bichat under Desault's name, contain his whole system. Consult Labrune, 'Etude sur la vie et les travaux de Desault' (Besançon 1867).

DESBARRES, dā-bär', **Joseph Frederick Wallet,** English military engineer: b. England 1722; d. Halifax, N. S., 24 Oct. 1824. In 1756 he sailed as lieutenant for America, where he raised, and for a time commanded, a corps of field artillery. In 1757 he gained a victory over the Indians who had captured Fort Schenectady; and at the siege of Quebec was aide-de-camp to Wolfe, who was mortally wounded while Desbarres was making a report. He conducted the subsequent engineering operations during the conquest of Canada, and was quartermaster-general in the expedition that retook Newfoundland (1762). He made a survey of the coast of Nova Scotia in 1763–73, and afterward prepared charts of the North American coast for Lord Howe. He was lieutenant-governor of Cape Breton (1784–1804), and of Prince Edward Island (1805–13).

DESCARTES, René, rė'nā dā-kärt', distinguished French philosopher: b. La Haye in Touraine, 31 March 1596; d. Stockholm, 11 Feb. 1650. He was educated at the Jesuit College of Le Flèche. Here he studied physics and philosophy according to the scholastic system and showed especial fondness and aptitude for mathematics, which alone seemed to satisfy his demand for certain and clear knowledge. All else that he had learned seemed to him lacking in the clearness and certainty that would entitle it to be ranked as knowledge. After leaving school he went to Paris where he continued his studies. He then enlisted in the military service of the Netherlands and afterward in that of Bavaria. During these years he was always tormented by doubts, and was constantly seeking a method by which he could attain certainty. At length he made the discovery of his famous principle of certainty which he expressed in the proposition, "I think, therefore, I am" (*cogito ergo sum*), and which he regarded as "the foundations of a wonderful science." In 1629 he withdrew into seclusion in Holland, frequently changing his residence that he might continue his work without interruption. Here he lived for 20 years and produced the works upon which his fame rests. In 1649 he accepted the invitation of Queen Christina of Sweden to come to Stockholm and personally instruct her in his philosophy. The Queen preferred to have her lectures in philosophy at 5 o'clock in the morning and Descartes had to proceed to the palace at that hour. The severity of the climate and the life at court were injurious to his naturally weak constitution, and a year after his arrival he contracted an illness from which he died.

Descartes' fame rests not merely upon his contributions to philosophy, however, but also upon his services to physical science and mathematics. He discarded the old methods of explaining physical phenomena by means of final causes, and insisted that everything takes place mechanically. He is one of the chief pioneers of the mechanical view of the world, and formulates clearly the fundamental laws of this mode of explanation, which he extends to explain all physiological processes. In mathematics he made important contributions to the theory of equations and was the originator of the science of analytical geometry.

Descartes' principal works are 'The Discourse on Method' which gives a clear account of development of his thought and with which was published his 'Dioptrics,' 'Meteors,' and 'Geometry,' under the common title of 'Essais philosophiques' (1637); 'Meditations on the First Philosophy' (1641); 'The Principles of Philosophy' (1644); 'The Treatise on the Passions' (1650). Modern editions of Descartes are those by Cousin (Paris 1826), and by Adam and Tannery (12 vols., ib., 1897–1910). The most important writings have appeared in the English translations of Veitch (Edinburgh 1907) and Torrey (New York 1892). Consult Boutroux, 'L'Imagination et les mathématiques selon Descartes' (Paris 1900); Fischer, 'Geschichte der neuern Philosophie' (Heidelberg 1897); Fouillée, 'Descartes' (Paris 1893); Hoffmann, 'René Descartes' (Stuttgart 1905); Haldane, 'Descartes: His Life and Times' (London 1905); Iverach, 'Descartes, Spinoza and the New Philosophy' (New York 1904); Mahaffy, 'Descartes' (Edinburgh 1881); Smith, 'Studies in Cartesian Philosophy' (London 1902); Millet, 'Descartes, sa vie, ses travaux, et ses découvertes' (2 vols., 1871). For Descartes' philosophy see the article CARTESIANISM.

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DESCARTES' RULE OF SIGNS is a theorem by which the maximum number of positive or negative roots of an equation can at once be detected on sight. The theorem may be thus explicated: The number of positive roots of an equation cannot exceed the number of variations in the signs of its coefficients, con-

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sidered in their proper order. A fair example is the cubic equation: $F(x)=3x^3-7x^2+11x+4=0$. Here are but two variations of signs on passing from one extreme term to the other, through the intermediate ones; we conclude therefore that the cubic cannot have more than two positive roots. The maximum number of negative roots is seen on applying the same theorem to the equation which is obtained from the original by changing x into — x. Thus the positive roots of $F(-x)=3x^3+7x^2-11x+4=0$ are negative roots of the original cubic, and by Descartes' rule cannot exceed three.

DESCENDANTS, as a term of law, is applied to the issue of a person, or the offspring of such issue, to the farthest generation. Such descendants have a prior claim over collateral relatives or ascendants in the inheritance of property left by a deceased ancestor. See Descent.

DESCENT IN LAW is the transmission of the real estate of a person dying intestate to his heir or heirs. The title acquired by the heir, in this manner, is called title by descent.

Prior to the Revolution, the law in England was that real estate could only descend and never ascend; but in the United States the law has been changed by statute, and at the present time real estate may ascend as well as descend; but, as far as the title is concerned, it is called title by descent.

According to the old English law, real estate descended to the oldest son who was living; provided that he had no elder brother who had died leaving a son to survive him; if all the sons had died without leaving issue, all of the daughters inherited together. There were exceptions to this rule, as in one part of England, the youngest child was the heir. Estates tail might also be called an exception, in some cases, as an estate tail female, where the daughter took the property; and if there were no daughters, the estate went to a person outside of that immediate family, the sons being excluded absolutely. In the United States, some of the States have passed laws by which any words used, in the granting of an estate, which would create an estate tail shall be considered as creating an estate in fee simple, and by this means have abolished estates tail.

The rules of descent are applicable only to real estate, although sometimes they are incorrectly spoken of as applying to personal property also. Distribution is the proper word to use in speaking of personal property.

In many of the States there is a wide distinction between the laws of descent and those of distribution. The laws on the subject are regulated by statute of the different States, and are consequently subject to change at any time. These laws differ materially, and it is therefore necessary to examine with care the statutes of any particular State in order to determine its rule on this subject.

The general rule in the United States seems to be that real estate, subject to the rights of the surviving spouse, descends to children, grandchildren and on down in the lineal line; in default of these heirs, then to parents, and, if they are dead, the estate goes to collaterals; and if there are no heirs to the State. In only a few States are the husband and wife placed in the line of inheritance. The law of the place where the real estate is situated is the law according to which the estate passes to the heir; and it makes no difference where the decedent was domiciled.

DESCENT OF MAN AND SELECTION IN RELATION TO SEX, The, a work by Charles Darwin, published in 1871. The evidences of the descent of man from some earlier, less-developed form, collected and marshaled by Darwin, consist of minute inferential proofs of similarity of structure, at certain stages of development, between man and the lower animals. This similarity is especially marked in the embryonic stages; and taken with the existence in man of various rudimentary organs, seems to imply that he and the lower animals come from a common ancestor. Darwin reasons that the early ancestors of man must have been more or less monkey-like animals of the great anthropoid group, and related to the progenitors of the orang-outang, the chimpanzee and the gorilla, and that his much remoter ancestors must have been aquatic. The 'Descent of Man' was received with enthusiasm by scientific men, and its influence was much greater than that of the 'Origin of Species.' It had a lasting effect not merely on physical and biological science, but on ethical and religious conceptions. In the volumes containing the 'Descent of Man' Darwin placed his elaborate treatise on sexual selection, which may be regarded as a part of the theory of man's descent. See Darwinian Theory.

DESCHAMPS, dā-shäñ', **Eustache,** called Morel, French poet: b. Vertus, Marne, about 1330; d. after 1415. He composed a multitude of short poems of a political or moral nature. The 'Miroir de mariage' comprises 13,000 lines. He wrote also 'De l'art de dicter' (on the Art of Poetizing). His works were edited by Saint Hilaire (11 vols., 1878–1903). Consult Hoeppner, E., 'Eustache Deschamps' (Strassburg 1904).

DESCHANEL, dā'shä'nĕl', **Emile Auguste Etienne Martin,** French critic: b. Paris 1819; d. 1904. He studied at Paris, becoming professor of rhetoric at the Normal School, and wrote literary and other criticism for the *Revue des Deux Mondes.* These essays took on a radical quality, especially those on 'Catholicisme et socialisme,' which offended the government. After the coup d'état (1851), he was arrested and expelled from his country. He fled to Belgium, where he engaged in literary labors and made the acquaintance of Victor Hugo. When it became safe for him to return to France, he at once resumed his literary work by becoming one of the editors of the *Journal des Débats* (1859). In 1876 he became deputy, and was re-elected in the following year. The Collège de France called him to the chair of modern literature in 1881. A few months later he was elected senator. Of his works the following are the best known: 'Histoire de la conversation' (1857); 'Etudes sur Aristophane' (1867); 'Le romantisme des classiques' (1882); 'Le théâtre de Voltaire' (1886).

DESCHANEL, Paul (Eugène Louis), French statesman and author: b. Brussels

1856. His father had been exiled because of difficulties with the government of Napoleon III. He was educated at the Collège Saint-Barbe and the Lycée Condorcet. In 1878 he became subprefect of Dreux, and was secretary-general of Seine-et-Marne and subprefect of Brest in 1879. He entered the Chamber of Deputies in 1885 as member for Eure-et-Loir, became vice-president of the Chamber in 1896, and president 1898–1902. He was a leader of the Progressive Republicans and a firm advocate of the separation of church and state. He was again president of the Chamber in 1912–16. In 1899 he was made a member of the French Academy, and was a candidate for the office of President of the Republic. His publications include 'La Question du Tonkin' (1883); 'La politique française en Océanie' (1884); 'Les Intérêts français dans l'océan Pacifique' (1888); 'Orateurs et Hommes d'Etat' (1888); 'Figures de femmes' (1889); 'Figures littéraires' (1890); 'Questions actuelles' (1891); 'La décentralization' (1895); 'La Question sociale' (1898); 'La République nouvelle' (1898); 'Quatre ans de présidence' (1902); 'L'idée de patrie' (1905); 'Politique intérieure et étrangère' (1906); 'A l'Institut' (1907); 'L'organization de la démocratie' (1910); 'Hors des frontières' (1910); 'Paroles françaises' (1911); 'Segrais, Madame de Sévigné' (1911); 'Lamartine' (1913).

DESCHUTES RIVER, Oregon, a river rising in the Cascade Range in Klamath County. After a northeasterly course through Crook and Wasco counties, it empties into the Columbia River. Its length is 320 miles, and its course for 140 miles runs through the great northwestern lava bed, forming a canyon with walls 1,000 to 2,500 feet in depth. More than a hundred layers of stratified lava are thus uncovered.

DES CLOIZEAUX, dā.klwä'zō, **Alfred Louis Olivier Legrand**, French mineralogist: b. Beauvais 1817; d. 1897. He devoted himself to the study of science and became an instructor in the Ecole Centrale des Arts et Manufactures, and later lectured at the Ecole Normale. In 1876 he was appointed to the chair of mineralogy at the Muséum d'Histoire Naturelle. His principal contributions to science were in the study of the optical properties of crystals, on which he based his crystallographic system. His discoveries include microline, a triclinic potash feldspar ($KAlSi_3O_8$) and the circular polarization of cinnabar. On the subject of crystallography he wrote 'Leçons de cristallographie' (1861); 'Manuel de minéralogie' (2 vols., 1862–93); 'Nouvelles recherches sur les propriétés optiques des cristaux' (1867). He was elected a member of the Academy of Sciences in 1869 and was awarded the Wollaston medal by the Geological Society of London (1886).

DESCLOT, dĕ-sklō', **Bernat**, a Spanish historian who flourished in the latter half of the 13th century. He is known chiefly as the author of a Catalonian history of great linguistic value. Originally published under the title 'Libre del rey En Pere,' it is the oldest narrative of importance in the Catalan language. A Castilian translation was made by Rafael Cervera (Barcelona 1616) and an edition appeared in Madrid in 1793. The first modern edition was made by Bouchon under the title 'Chroniques étrangères relatives aux expéditions françaises pendant le treizième siècle' (Paris 1841).

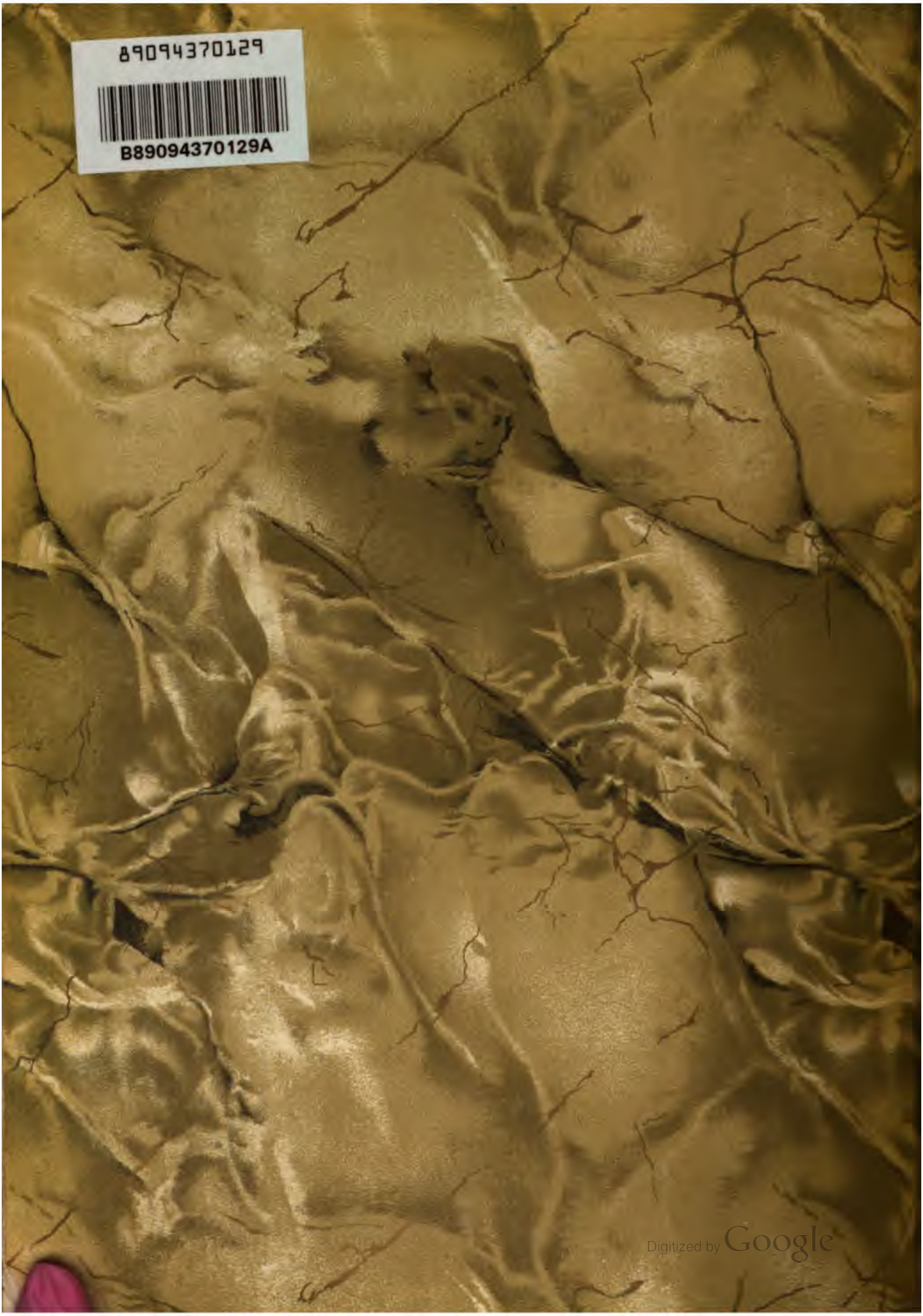
DESCROIZILLES, dā-krwā-zēl', **François Antoine Henri**, French chemist: b. Dieppe, 11 June 1751; d. Paris, 14 April 1825. He studied chemistry at Paris under Rouelle, and later became professor at Rouen. He devoted himself to the technical applications of the science. Berthollet had just discovered bleaching by chlorine, when Descroizilles tried it with success at his works at Lescure-lez-Rouen. He collected the chlorine in water containing chalk, and thus made a step, at a very early period, in the direction of bleaching-powder. In the course of his operations he contrived different pieces of apparatus for the rapid valuation of commercial products. His alkalimeter for the estimation of alkalis by Vauquelin's method, his apparatus for estimating vinegar (acetimeter), and for bleaching liquid (Berthollimeter), are among the earliest contributions to volumetric analysis. He also invented a still for the estimation of alcohol in wine and was the first to show that alum is a double salt. He published a great many treatises, especially on technical chemistry, one of considerable value on a simple method of conserving stored grains.

DESDEMONA, the heroine of Shakespeare's tragedy 'Othello.' She is the daughter of a Venetian senator, Brabantio, and is drawn to love the Moor who visits her father, by hearing him relate the vicissitudes of his adventurous career. She marries him against her father's will and proves a devoted wife, but Othello, through the machinations of Iago, is led to doubt her fidelity, and, in a jealous rage, smothers her. Desdemona's character is marked by modesty, sweetness and innocent trustfulness. See OTHELLO.

DESEADA, dĕs-ĕä'dä. See DÉSIRADE.

DESERET, State of (from *deseret*, "Book of Mormon," signifying "land of the honey-bee"), the name given to the State of Utah, 5 March 1849, at a convention of Mormons in Salt Lake City, when they adopted a constitution establishing "a free and independent government by the name of the State of Deseret." Congress refusing recognition created the Territory of Utah (q.v.) the year following. See COMPROMISE OF 1850.

DESERONTO, Canada, a town in Hastings County, province of Ontario, on the Bay of Quinte, at the mouth of the Napanee River and on the Canadian Northern Railway. It is about 132 miles east of Toronto. Its principal manufactories are lumber-mills, flour and furniture, car shops, shipyards, chemical works, locomotive works, foundry and iron smelting works. It is an attractive summer resort. Pop. 2,013.



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